CHRONOLOGICAL SUMMARY OF SIGNIFICANT EVENTS

The following chronology summarizes some of the more significatn events which took place with respect to the Spring River, the Verona plant, NEPACCO and EPA Regional actions and investigations. The summary was compiled from files, interview notes and various documents acquired by the Region throughout the course of the investigation. The chronology is certainly not all inclusive, but is only intended to provided historical perspective for those more important events particularly as related to waste treatment, handling or movement.

CHRONOLOGY

- o September 28, 1961 - Letter from Raymond McNerney (son of local landowner) to Missouri Conservation Commission (MCC) requesting investigation of pollution in Spring River.
- o October 9, 1961 - Letter from MCC to Missouri Water Pollution Board (MWPB) proposing field investigation.
- o October 23, 1961 - Letter from MWPB to the Hoffman-Taff Company (H-T) investigate source of pollution, similar to past pollution problems at H-T plant in Wilson Creek at Springfield, Missouri.
- o March 25, 1965 - Letter from MWPB to H-T stating a permit will be required for waste discharge into Spring River.
- o April 2, 1965 - Letter from MWPB to H-T requesting schedule for pollution abatement and permit application submission.

- October 15-17, 1966 - Opened "Syntex" trench #1.
- April 5, 1967 - Closed "Syntex" trench #1. Opened "Syntex" trench #2.
- August 7, 1967 - Letter from MWPB to H-T requesting time schedule for abatement of pollution.
- November 10-13, 1967- Closed "Syntex" trench #2. Opened "Syntex" trench #3.
- May 1968 - H-T starts producing herbicide orange for military - detection limits 0.1 ppm for TCDD.
- November 21-22, 1968- Closed "Syntex" trench #3.
- February 1969 - H-T discontinues herbicide production.
- April 9-16, 1969 - Opened "Syntex" trench #4.
- July 3, 1969 - NITINE Agreement with NEPACCO to buy 1,000,000 lbs hexachlorophene the first year.
- November 18, 1969 - NEPACCO leased "orange" manufacturing line.
- December 1969 - Syntex acquires Verona plant.
- February 1970 - H-T shipped final product (agent orange) to Kelly AFB.
- April 15, 1970 - NEPACCO starts production, first batches TCP.
- May 15, 1970 - NEPACCO completed first batch hexachlorophene.
- August 28, 1970 - Opened "Syntex" trench #5.
- October 6, 1970 - NEPACCO ships still bottoms to Baton Rouge, Louisiana for incineration by Rollins Environmental Services.
- October 13, 1970 - NEPACCO ships second load of still bottoms to Louisiana for incineration.
- December 9, 1970 - NEPACCO ships third load of still bottoms to Louisiana for incineration for a total of 12,609 gallons.

- o January 21, 1971 - Memo, MWPB to Office file, Black and Veatch still studying waste treatment system for H-T. Problems arose from trying to detoxify waste from NEPACCO.
- o February 9, 1971 - Letter from H-T to MWPB stating steps to eliminate seepage and overflow from lagoons. Discussion on NEPACCO's waste.
- o February 16, 1971 - Russell Bliss removes 3,000 gallons of still bottoms
- o March 23, 1971 -- NEPACCO fire.
- o March 26, 1971 - Letter from Missouri Division of Geological Survey and Water Resources to MWPB on lagoon survey and black tarry residue in open ditch resulting from March 23 fire.
- o April 1, 1971 - Letter from landowner to MWPB requesting an inspection of H-T because of information on midnight dumping of waste.
- o April 1-8, 1971 - Closed "Syntex" trenches #'s 4 & 5.
- o April 3, 1971 - Office memo of MWPB on NEPACCO contacting Conservation Chemical Company for waste disposal.
- o May 10, 1971 - Memo of H-T on inspection of plant by MWPB on May 4, 1971 with Items of Concern, high BOD's COD's, waste hexachlorophene, ineffectiveness of waste treatment and seepage from lagoon.
- o May 12, 1971 - Memo WMPB on-site inspection of H-T and NEPACCO operations, hexachlorophene spill, H-T sanitary treatment facility serves only as a holding basin.
- o May 20, 1971 - Russell Bliss removes 3,500 gallons of still bottoms. Truck ticketed as being overweight. Driver off-loads a portion of waste on Bliss farm in Rosati, Missouri.
- o May 24, 1971 - Letter from Missouri Geological Survey and Water Resources to MWPB indicating testing is being done on H-T lagoons.

- o May 25, 1971 - Bliss removes 3,000 gallons of still bottoms.
- o May 25, 1971 - Shenandoah Stables horse arena sprayed with estimated 2,000 gallons of still bottoms from NEPACCO.
- o May 26, 1971 - Letters from Geologic Survey to MWPB and H-T indicating that chemical tests were inconclusive and further studies to be done. Also checking S. B. Erwin's spring.
- o June 11, 1971 - Bubbling Springs Horse Arena sprayed with oil/still bottom mixture.
- o June 14, 1971 - Letter from MDC to MWPB reporting on contaminated spring on Mr. Erwin's farm.
- o June 15, 1971 - H-T memo - water quality analysis of spring on S. B. Erwin's farm indicated bacteriological pollution (total plate count $65X10^6$ organisms per ml).
- o June 16, 1971 - Bliss sprays Timberline Stables horse arena with oil/still bottom mixture.
- o June 23, 1971 - Memo MWPB studies indicate possible leakage from H-T lagoons to Mr. Erwin's springs.
- o June 29, 1971 - Letter from Geologic Survey to MWPB indicating Verona septic tanks should also be tested for leakage into Spring River.
- o July 1971 - NEPACCO takes material to Denney farm.
- o July 30, 1971 - Bliss removes 3,000 gallons of still bottoms.
- o August 3, 1971 - Letter from landowner to MWPB indicating pollution source from H-T entering Spring River.
- o August 10, 1971 - Status report on dye tracing at Verona by Missouri Geological Survey. Although inconclusive H-T lagoon complex is suspect.
- o August 16, 1971 - Letter from MWPB to EPA indicating problems in Spring River for past 2-3 years by H-T. Steps being taken to alleviate groundwater contamination.

- o August 22, 1971 - Contaminated soil from Shenandoah Stables placed in Highway 61 fill.
- o August 24, 1971 - First CDC report on investigation of horse arenas, Lincoln County horse arena, compatible with PCB intoxication.
- o September 1, 1971 - Memo MWPB-samples of Spring River and Erwin farm spring with COD results (148 mg/l).
- o September 8, 1971 - NEPACCO denied further use of lagoons on Syntex property for disposal of wastewater.
- o September 9, 1971 - Letter from H-T to MWPB-12:00 Noon, September 8, 1971, H-T will discontinue treatment of liquid wastes from NEPACCO.
- o September 17, 1971 - Memo MWPB-NEPACCO asked about feasibility of discharging waste to the Aurora STP.
- o September 27, 1971 - Letter from MWPB to NEPACCO approving use of irrigation on site for the vacuum loop water.
- o October 4, 1971 - Bliss removes 3,000 gallons of still bottoms.
- o October 25, 1971 - Bliss removes last 3,000 gallons of still bottoms for total of an estimated 18,500 gallons.
- o October 30, 1971 - National Oil and Supply starts trucking NEPACCO wastewater to Neosho digester.
- o November 2, 1971 - Reconnaissance of Spring and Elk River basins by EPA, pollution from H-T noted.
- o November 6-13, 1971 - Entire "Syntex" trench area smoothed over.
- o January 10, 1972 - NEPACCO makes last batch of hexachlorophene - total 328 batches TCB - 611 batches hexaclorophene.
- o February 8, 1972 - National Oil and Supply complete removal of wastewater to Neosho digester for a total of 225,000 gallons.
- o April 1972 - Additional soil removed from Shenandoah Stables and placed in slough adjacent to stables.

- o July 1972 - NITINE taken over by American Cyanamid Company remaining inventory sold back to NEPACCO.
- o August 1972 - Contaminated soil removed from Timberline Stables and buried in a sanitary landfill near Jefferson City, Missouri.
- o September 1972 - FDA began requiring new drug applications for all drugs containing 0.75% or more hexachlorophene and also requires that these drugs be made available only by prescription.
- o March 1973 - Approximately 850 yards of soil excavated from Bubbling Springs horse arena placed as fill at Minker residence and Vern Stout property.
- o May 13, 1974 - NEPACCO liquidates its assets - sold inventory to Winthrop and Givaudan.
- o August 2, 1974 - CDC report-identification of TCDD in horse arenas.
- o August 1974 - 4,300 gallons of still bottoms discovered in tank at plant in Verona.
- o August 9, 1974 - Soil samples collected by CDC of horse arenas and fill areas that were potentially contaminated.
- o February 24, 1975 - Syntex press release indicated that 4,600 gallons of residue left in tank by NEPACCO contained 350 ppm dioxin.
- o April 1978 - Verona changed from individual spetic tanks to an oxidation ditch unit for sewage treatment.
- o Summer 1978 - EPA collected water, sediment, and fish flesh samples 3 miles downstream from Syntex with the exception of two phthalates all priority pollutant analyses were below detection limit.
- o February 1979 - EPA conducted O&M and NPDES Inspection at the Verona Municipal Wastewater Treatment Plant. Effluent contained <0.5 ng/l 2,3,7,8-TCDD

- October 1979 - EPA receives anonymous phone call alleging other NEPACCO waste disposal sites in southwest Missouri. EPA conducts two-week field investigation interviews 25 people and identifies three potential sites including Denney Farm Site, Syntex Trenches and Baldwin Park.
- December 5-6, 1979 - EPA samples three municipal wells plus six private wells in Aurora and mine shaft standing water in Baldwin Park-TCDD analyses negative.
- January 7, 1980 - EPA samples drums on Crider Farm.
- February 12, 1980 - EPA circulates draft study plan for sampling investigation of Denney Farm Site.
- May 1980 - EPA prepares and distributes contingency plan for Syntex TCDD reduction project.
- May 19, 1980 - Syntex begins TCDD reduction project for 4,300 gallons of NEPACCO still bottoms left in tank in Verona. Reduction exceeds 99 percent.
- April 22, 1980 - EPA initiates sampling investigation of Denney Site.
- June 20, 1980 - Wright state reports total TCDD in Denney Site samples up to 319 ppm.
- August 11, 1980 - EPA begins another week of investigation in southwest Missouri to follow-up on additional leads and tips resulting from Denney site publicity.
- August 15, 1980 - Syntex removes drums from Crider Farm along with some hay, corn and potatoes.
- August 15, 1980 - EPA inspects Rusha Farm and collects samples of clay filter material and feedlot soil.
- September 1980 - Water and Wastewater School officials in Neosho, Missouri take sample of NEPACCO wastewater residue, to Wright State for TCDD analysis.
- September 12, 1980 - Syntex enters into consent decree to clean up Denney Farm Site.

- o October 29, 1980 - EPA/SVAN circulates to Regional Office status report on NEPACCO sites in southwest Missouri.
- o November 18, 1980 - Wright State reports 1.8 to 1.9 ppm total TCDD in Neosho sample of NEPACCO residue.
- o January 14, 1981 - EPA first learns about TCDD in Neosho from reporter.
- o January 19, 1981 - EPA assists school staff in cleaning up NEPACCO residue on campus-take samples.
- o March 5, 1981 - EPA Regional Lab confirms TCDD at Neosho school.
- o March 23-25, 1981 - EPA assists school officials in putting cap over spill area. Soil still has 62 ppb total TCDD. Residue moved to bunker. Syntex erects security fence around spill area.
- o April 1981 - Runoff sample collected following precipitation at Baldwin Park. Results negative.
- o April 20, 1981 - EPA/SVAN prepares summary report on NEPACCO sites including horse arena sites - requests guidance from Dioxin Task Force.
- o May 21, 1981 - EPA collects sample from the bottom of the digester in Neosho, Missouri. 2,500 mg/kg 2,4,5-TCP, 60 ug/kg total TCDD.
- o June 15, 1981 - Syntex begins cleanup of Denney Farm Site.
- o July 28, 1981 - EPA samples filter material and soil on the Erwin Farm. TCDD ranges from 6 to 8,700 ppt.
- o July 29, 1981 - Syntex completes excavation at Denney Farm Site.
- o August 5-7, 1981 - EPA collected environmental samples from the area surrounding the Neosho, Missouri wastewater treatment plant. Results negative.

- October 16, 1981 - EPA and Syntex officials meet with S. B. Erwin about TCDD on farm.
- October 28, 1981 - EPA briefs Dioxin Task Force on Denney Site and Spring River basin. Department of Agriculture also briefed.
- November 10, 1981 - EPA/SVAN memo addresses likelyhood of TCDD in Spring River fish.
- November 16, 1981 - EPA and Missouri Department of Conservation collect Spring River fish.
- November 24, 1981 - Syntex begins closure of Denney trench.
- December 15, 1981 - EPA reports preliminary data showing TCDD in Spring River fish.
- December 8, 1981 - EPA deposes John Lee, Vice President of NEPACCO.
- February 19, 1982 - Water and Wastewater School, Neosho, Missouri dissolved.
- February 24, 1982 - EPA and Syntex take split composite soil samples from Denney site microbiological degradiation basin.
- March 16-17, 1982 - On-site reconnaissance of an open dump in Verona (Bill Ray site) samples collected. 160 ppb TCDD
- March 22, 1982 - EPA/ENSV releases preliminary draft report on Spring River investigation.
- March 25, 1982 - State has public meeting to caution residents about consumption of Spring River fish.
- April 1, 1982 - EPA deposes Edwin Michaels, President of NEPACCO.
- April 9, 1982 - EPA conducted a metal detector survey at Syntex burn area.
- May 20-June 2, 1982 - EPA collectes soil, water, and sediment samples from Horse Arenas and fill areas where contaminated material was placed or drained into.

- o June 2, 1982 - Two drums from Bill Ray Site overpacked and taken to Syntex.

- o June 24, 1982 - Syntex submits proposal for sampling of Syntex trenches, burn area, lagoon area, and irrigation area.

APPENDIX D

CHRONOLOGICAL SUMMARY OF CORRESPONDENCE ON THE SPRING RIVER 1961-1971

APPENDIX D

SPRING RIVER WATER QUALITY PROBLEMS

There is a wealth of information on water quality problems in the Spring River. The files of the Missouri Department of Natural Resources* (MDNR) Regional Office in Springfield, contain extensive correspondence, memorandums, and reports of inspections related to Hoffman-Taff and the river. Although the file material goes back to 1961, water quality problems apparently intensified during NEPACCO's 1970 through 1971 manufacturing activities. This appendix is a compilation of those MDNR files.* In addition there is one entry, November 1971, taken from EPA SVAN files.** In the following compilation, the author's comments are in [brackets].

1961

September 28 - Letter from Raymond McNerney (private citizen and son of local landowner) to Herb Fisher, Missouri Conservation Commission (MCC).

> "I recently visited my parents who live in Verona, Missouri, and was alarmed to discover Hoffman Taff Chemical Company at Verona are allowing industrial waste to flow into Spring River. There is a white moss-like substance covering the river bed below where the waste is entering Spring River. At the point where this waste is flowing in the river, a black sludge covers the bottom and a sewer foul odor is evident. I hope you will investigate this pollution before Spring River becomes another Wilson Creek. Enclosed is a sketch map of the area."
>
> [Copy of sketch is not legible and is deleted from this report.]

* Formerly called Missouri Clean Water Commission and Missouri Water Pollution Board before that.

** Divisional name changed to Environmental Services (ENSV) January 4, 1982.

1961

October 9 - Letter from Herbert J. Fisher, Fishery Biologist, MCC to John Schondelmeyer, Missouri Water Pollution Board (MWPB).

> "I have received a report of pollution of Spring River by wastes of the Hoffman Taff Company at Verona, Missouri. This matter was discussed by telephone with Mr. Ed Lightfoot [with MWPB] on October 9, 1961. He suggested that you investigate this problem sometime during the week of October 16-20 when you are with the crew surveying Center Creek.
>
> I have written to Mr. McNerney, who reported the problem, stating that a representative of the Water Pollution Board and I would look into the matter during the next few weeks. Unfortunately, I have another commitment in Iowa on October 19, 1961 so I will be unable to accompany you.
>
> I think that the Hoffman Taff waste problem is an important one. This company has caused serious pollution problems in Wilson Creek in Greene County in the past, and it seems to me that if you find a polluted condition of the river caused by this company, recommendations for some action should be taken.
>
> I will appreciate receiving a copy of the rport of your findings so that I can notify Mr. McNerney that an investigation was conducted by you.
>
> A copy of Mr. McNerney's report and a copy of my letter of reply to him is enclosed for your use."

October 23 - Letter from Bill L. Sankpill, Field Engineer, MWPB to Bill Zay, Hoffman-Taff Company (H-T).

> "A representative of the Water Polution Board made an investigation of a pollution complaint of the Spring River just below the Hoffman-Taff Plant at Verona, Missouri on October 21, 1961.
>
> The Plant Manager and I walked the branch from the plant to where the old stream enters the present stream. As I mentioned at the time, there is evidence of pollution at this point.

The stream is black in color and there is a foul odor. Also, there is a grey algae growth in the stream below the confluence of the two streams. This is very similar to the grey algae growth in Wilson Creek below the Hoffman-Taff plant effluent at Springfield, Missouri. You indicated to me at the time that an immediate investigation of the source of this pollution would be initiated. We would appreciate at your earliest convenience your findings in this matter, and what you have done to correct this.

Thank you for your cooperation."

October 25 - Letter from J. E. Rundell, Vice President in Charge of Research and Development, H-T to Sankpill, MWPB.

"In reply to your inquiry of October 23, 1961, addressed to Mr. William Zay, we have investigated various points in our waste disposal basin for possible leaks which might be entering the Spring River branch. The main apparent point which shows a high B.O.D. load is in an old sewer line which evidently drains the abandoned Empire District water treatment basins which lie immediately north of our plant. We suspect, although we have not located it through several diggings, that a broken conduit or tile lies under our pond which carries flow to these gravel filled basins and from there to the old drainage tile.

To alleviate this problem, rather than trying to seal the present retention pond, we are installing a 20'x 30'x 8' deep concrete basin which will receive all of our liquid wastes from the plant. We are also installing an agitated evaporator for the purpose of drying these liquors down to a dry residue which will then be burned or hauled to a suitable disposal area. This work is under way and should be completed in about a month.

As a temporary expedient we have instructed our plant operators to sweep, rather than wash down the floors, and to return to process all wastes wherever possible.

We are confident that these modifications will solve the problem shortly."

1961, Continued

October 26 - Letter from Sankpill, MWPB to Rundell, H-T.

"With reference to your letter of October 25, 1961, we wish to express our appreciation of your prompt action in this matter.

Your continued cooperation is solicited in the future.

If we may be of assistance to you in any way in your problem of waste treatment, please advise."

1963

March 21 - Letter from Fisher, MCC to Keith Fraser, Frisco Transportation Company.

"Reference is made to your letter of March 15, 1963 [letter not in file] to Assistant Director, Dan Saults, concerning the possible pollution of Spring River in the Verona area.

I have conferred on the matter with Edward Lightfoot, Chief Engineer of the Water Pollution Board. According to present plans, an intensive pollution survey of the Spring River and some of its tributaries will begin sometime within this year. During the study, an industrial waste survey will be made of the industries along the river. In addition, biological and chemical sampling of the stream(s) will be conducted.

Thank you for the information and for your interest in pollution abatement."

1965

March 25 - Letter from Jack K. Smith, Executive Secretary, MWPB to Rundell, H-T.

"At the present time, a water quality study of the Spring River is being conducted. This stream heads just south of Verona, Missouri, then flows north by Verona and finally west until it reaches the Kansas state line, then swings south. During this study, it was observed that a waste discharge was entering the stream about one-fourth mile north of

1965, Continued

your plant at Verona. This waste was traced back to your plant. According to a letter from you written on October 25, 1961, the liquid waste from your plant is to be discharged to a concrete tank and evaporated, and the residue hauled to a suitable disposal area. Where is this area located?

As you know, the water pollution law requires that you obtain a permit to discharge wastewater to a stream. You are to adivse this office by April 12, 1965 what your plans are concerning this waste."

March 29 - Letter from Rundell, H-T to Smith, MWPB.

"In reply to your letter of March 25, 1965 regarding our Verona plant and its waste discharge, we are utilizing the conrete tank and evaporating the waste to a solid residue. This residue, along with filter cake discharges, floor sweepings, etc., we are paying a commercial hauler to remove to the Aurora town dump where it is discarded.

Since this was started, we have, of course, added more processes and more equipment. In each case, we have been concerned about the aspect of pollution and endeavored to re-cycle and confine all wastes from the processes involved. It is our intention to continue sampling and install whatever additional equipment is necessary to avoid pollution problems.

Realizing that these problems will be more and more acute as the plant expands, we are planning and acquiring equipment for a good sized pilot unit for the study of the biological treatment of our wastes by the activated sludge method. It is hoped that with the help of consulting engineers, we can gather sufficient data for the design of an adequate treatment plant to meet our growing needs and satisfy your board as to its efficiency."

[Based upon information supplied by an interviewee and following metal detector readings, SVAN has reason to believe that the H-T solid waste is located in the northeast corner of the old Aurora dump, which was renovated in 1973 and is now known as Baldwin Park, a 180-acre tract. The nature of these wastes is not known.]"

1965. Continued

April 2 - Letter from Smith, MWPB to Rundell, H-T.

"Thank you for your informative letter of March 29, 1965 regarding the waste discharge from the Verona plant.

Encloseed for your benefit, are applications for a permit to discharge waste to waters of the State. Please give volume and strength of waste, including a list of oil constituents.

Since you do have a waste discharge and plan to expand causing an additional discharge of waste, please submit a reasonable schedule for abatement as follows:

1. Date application will be submitted for operating permit to discharge waste to waters of the State.

2. Date engineering report will be submitted to the Missouri Water Pollution Board for review and approval.

3. Date plans and specifications will be submitted for review.

4. Date construction will start.

5. Date abatement facilities will be completed and placed in operation.

Please submit the above schedule by May 1, 1965."

April 5 - Letter from Randell, H-T to Smith, MWPB.

"This is in reply to your letter dated April 2, 1965. Evidently through an oversight, the applications for permit to discharge wastewater were not included with your letter. It would be appreciated if some could be sent to me."

April 23 - Letter from Rundell, H-T to Smith, MWPB.

"In answering your letter of April 2, some of the points will be vague, because of present lack of knowledge at this time. One factor which has arisen since my previous letter is that the Verona City Council has again developed an interest in trying to obtain approval of a sewer bond issue. As you will recall, this previously had been voted down.

1965, Continued

They have expressed an interest, should the vote turn out favorably, in working cooperatively with Hoffman-Taff on some type of treatment facility.

However, we have proceeded with our original plan for installing a large scale pilot unit for studying the activated sludge process. We have on order two 20 H.P. mixers - for aeration. The delivery date is early July. Also, ordered are three heavy-duty cypress tanks, the largest 28,000 gallons, a 600 cu.ft./min. air compressor and pH control equipment. We expect the tanks in early June and will begin installation at that time. We will also construct a sealed retention basin probably of 100,000 gallon capacity. The present plan is to begin gathering data by August 1965. We are retaining Black and Veatch as consultants in this study and the data gathered, as well as final plans and specifications, will be submitted through their organization. We hope to meet with Mr. Hoppe next week to discuss the various aspects of the city problem in relation to our own.

A number of the points requested in your letter are as yet unanswered. As we get further into the program, I feel sure that we can firm up the dates to your satisfaction."

October 19 - Letter from Mr. and Mrs. Robert H. Crum for the town of Verona to James W. Doarin, Regional Director, Health, Education, and Welfare.

"Received a letter from the Housing and Home Finance Agency to whom I had written for information. Verona is a small town in southwestern Missouri, population around 500; the town needed sewers and a disposal system. We have city water from Aurora whose lines pass through Verona. We have one chemical manufacturing plant in the town where they dump their refuge. I do not know, but in all probability they dump it into the Spring River. This is a pure water river. The main source of its water is a large spring about a mile ahead of the town. This water is ideal for trout and other game fish. It should be preserved in its pure state. There is a fish or rather a trout fishery at the Spring and possibly there is game

1965, Continued

fish farther downstream if the water has not been polluted too much, as some fish escape the screening at the fishery.

We would like to know where and how to start with the possibility of having sewers and a sewerage disposal system. A plan that the town could afford would be needed. The people here would like to have the town grow and be able to attract more industries, but without a sewerage disposal system it would be bad to have more industries and pollution of the river. We know that the government will grant part of the cost, but we would have to know something about the cost before we would get any action from the town's officials. What assistance could we get to have comprehensive plans for sewers and a disposal system prepared, and would this be covered by a grant? Do we set up a Rural Renewal Authority under State Law to do this development? I also have written to Mr. Jose, State Director of the Farmer's Home Administration, who was also referred to me by the Housing and Home Finance Agency in regard to the sewers to prevent pollution of this pure water river. We would like to keep it pure for game fish."

October 22 - Letter from Herbert C. Clare, Regional Program Director, Water Supply and Pollution Control to the Crums.

"Mr. James W. Dearn, Regional Director, U.S. Department of Health, Education and Welfare, has referred your letter of October 19, 1965 to this office for a reply. We certainly understand your feeling about the importance of a sewage system for Verona. Without such a system, growth of your municipality will undoubtedly be limited.

We know of no government agency that can prepare comprehensive plans for sewers and a disposal system for your team. It is possible that financial assistance for employing a qualified engineer to prepare such plans might be forthcoming from a governmental agency.

We note that you have already been in contact with the Housing and Home Finance Agency and the Farm Home Administration. For guidance in procedures which should be followed in this important project, we would like to refer you to Mr. Jack K. Smith, Executive Secretary, Missouri Water Pollution Board, P.O. Box 154, Jefferson City, Missouri 65102. For any

1966

financial assistance which might be forthcoming in the way of a grant from the Public Health Service, it will be necessary that Mr. Smith's agency certify the project as having priority over other projects and that the prbcedure you plan to follow is in conformance with the State Water Pollution Control Plan. It is, therefore, my suggestion that you contact Mr. Smith at your earliest convenience. He will keep us advised of any assistance we may be able to give."

July 7 - Letter from Rundell, H-T to Smith, MWPB.

"In reply to your letter of July 1, 1966 concerning public hearings of the Board to discuss the various drainage areas, it is our intention to have one or more representatives at the hearing in Carthage on August 4.

Also in this letter I will outline our company position both present and future in relation to Spring River as completely as possible.

WITHDRAWAL OF WATER FROM SPRING RIVER. At present we are using none. Our cooling and process water is being supplied by Empire District Company. Long range, as our usage increases, we hope to withdraw water from Marbut Springs, which discharges into Spring River. As in Springfield, this usage may approach substantial volume.

WASTE COOLING AND PROCESS WATER. At this time, we are endeavoring to discharge only waste cooling water into the stream. For the chemical processes we are now operating, we have either re-cycled or evaporated the wastes to dryness and hauled away for disposal. We have now installed chemical sewers, a concrete collecting sump and concrete pad for supporting a 60,000-gallon tank which will be stirred and aerated, and used for development studies involving the activated sludge digestion process. A sealed settling basin will also be installed. Several acres of land have been reserved for expanding this experimental treatment plant, as our needs and experience indicate.

We hope to introduce more and varied products into our Verona plant. The rate of expansion and type of product at the time is most difficult to prodict, undoubtedly each will have problems peculiar to it, and these will have to be solved by the various methods available.

1966. Continued

To comment on the general criteria for water quality in Spring River, I [?] that most people will agree that these are [?]. The various specific criteria will undoubtedly be discussed at the hearing. We lack sufficient general knowledge of the stream and other factors which might affect its condition to cover them at present."

[Words in brackets are not legible.]

1967

June 12 - Letter from O. John Schmidt, Black and Veatch, to Edward Lightfoot, MWPB.

"As you know, we have made some wastewater treatment studies for the Hoffman-Taff Pharmaceutical Company both in Springfield and Verona, Missouri. Because of the recent work done by the Missouri Water Pollution Board in establishing standards, I am wondering what the status of the Hoffman-Taff installation is at Verona, Missouri. Specifically, has Hoffman-Taff been advised that they must provide waste treatment facilities capable of producing a certain effluent at Verona? Or have they been advised of stream or effluent standards at Verona if such standards have been officially adopted? It would be most helpful to use in behalf of Hoffman-Taff if we knew of the latest developments in Verona as they relate to wastewater treatment requirements. Any information or assistance which you may be able to furnish me in this regard will be sincerely appreciated."

August 7 - Letter from Lightfoot, MWPB to Rundell, H-T.

"Mr. Schondelmeyer and I appreciate the cooperation we received from Harry Neele and William McMichael when we visited the Hoffman-Taff Plant in Verona. Mr. Neale and Mr. McMichael accompanied us as we made an industrial waste survey of the plant. We also observed the pilot plant for treatment of industrial waste and we observed the Spring River above and below Hoffman-Taff's discharge. Benthic organisms were found in the stream above the discharge, but no benthic organisms were found below the Hoffman-Taff effluent indicating damage has occurred to Spring River.

Where a waste is discharged and causing pollution of the waters of the State, it is the policy of the Water Pollution Board to request the owner to furnish the Board with a mutually agreeable time schedule for the abatement of pollution. We, therefore, request you furnish the following time schedule to the Board by September 7, 1967:

1967, Continued

1. Data engineering report will be submitted to the Board for review and approval.

2. Date construction will begin on waste treatment facilities.

3. Date waste treatment facilities will be placed into operation.

Mr. Schondelmeyer and I left a copy of the Water Quality Standards for the Spring River with you. The Water Pollution Board has adopted these standards, and they are presently being reviewed by the Federal Water Pollution Control Administration. When the FWPCA approves these standards, they will be the Federal Water Quality Standards for the Spring River.

I have reviewed the Verona file for information relating to a federal grant for sewage works to serve the City. The latest correspondence was a copy of a letter dated May 12, 1966 from Mr. Arthur I. Stanley, Acting State Director of the Farmers Home Administration to the county supervisor of FHA in Mt. Vernon. This letter requested the county supervisor to contact the city officials in regard to some FHA forms to be completed for a sewage works grant. Apparently the city qualifies for an FHA grant.

We will be happy to answer any questions you may have in regard to this letter."

December 13 - Letter from Sankpill, MWPB to Jim Whitley, Missouri Department of Conservation.

"Please find enclosed a letter [letter not in MDNR files] of request from Hoffman-Taff, Inc., Springfield, Missouri. They are planning sampling of the stream above and below their Verona Plant on the Spring River, and have mentiond in their letter they intend doing it in the same manner we have done it. Since we depend on you for our sampling procedure and sampling, we would appreciate your answering this letter with respect to the sample procedure, type of organisms to be analyzed, and equipment to be used."

1967, Continued

December 15 - Letter from W. H. Dieffenbach, Missouri Department of Conservation to Robert L. Stone, H-T.

"Your interest in the aquatic organisms which live in Spring River is gratifying. We at the Department of Conservation do the biological work for the Missouri Water Pollution Board, and they sent us your letter for a reply. It has been our belief that benthos (aquatic organisms associated with the stream bottom) data is more valuable than chemical or other data. Benthos represent a wide diversity of tolerances and provide year around bioassays of water quality.

I will attempt to give you the information you asked for in your November 30, 1967 letter to the Missouri Water Pollution Board. We sampled the Spring River at three locations, one above and two below your Verona, Missouri plant in 1964 and 1965. The data which we collected is part of a complete survey of the Spring River basin which will be completed in the coming year. Our sampling techniques are simple and well adapted to the various streams of Missouri. The equipment needed is (1) a nylon bottom net available from Turtox, number 105A33, (2) a pair of sieves; ours are made from rectangular plastic wash tubs. The bottoms are removed from the tubs and replaced with 1/4" hardware cloth in the upper sieve and 40 mesh to the inch strainer cloth in the lower. The third item necessary for sampling is a tool to dig up the riffle gravel. We have used a three-prong garden tool with good success. Six one-square foot samples are collected from various riffle habitats. The organisms are displaced from the riffle bottom by digging with the three-pronged garden tool. The organisms are swept by the current into the bottom net positioned about one foot downstream.

The sample is then washed from the bottom net into the two sieves for sorting. The upper sieve (1/4" hardware cloth) removes the larger stones, leaves, twigs, etc., and allows most organisms to pass to the lower sieve. All material collected in the lower sieve is preserved in 10% formaldehyde. All organisms remaining in the materials collected in the upper sieve are removed from the debris and preserved.

1967, Continued

December 15 - Dieffenbach - Stone letter continued.

"The samples are then taken to the laboratory for sorting and identification. The sample to be sorted is washed free of formaldehyde with water in a 40-mesh sieve. The separation of organisms from the debris is quite difficult and time consuming. Various methods are used, including a sugar flotation technique described by Richard O. Anderson of the Missouri Cooporative Fishery Unit, at Missouri University. The technique uses sugar water of specific density 1.11. This floats most organisms from rocks, etc. However, it is still necessary to separate the more dense organisms from the sinking debris.

The sorted materials are identified using a binocular disecting microscope. Identification requires a good knowledge of entomology and specific reference books. The most useful book would be "Freshwater Biology" edited by W. T. Edmondson and compiled by H. B. Ward and G. C. Whipple. Another valuable book would be "Freshwater Invertebrates of the United States" by Robert W. Pennak. Both of these books are incomplete, but provide a good basic reference library for the identification of aquatic organisms.

The evaluation of the benthos data is based upon the composition of the total population.

Our efforts to find indicators organisms to show good water quality have not been successful due to variation in distribution and habitat preference. Many publications have been written on the subject of water quality and related organisms. "Stream Life Below Industrial Outfalls" by William M. Ingram and W. W. Towne, and "Glossary of Commonly Used Biological and Related Terms in Water and Waste Water Control" by Jack R. Gerkler, et al. would be available from the Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio 45226.

I was interested in the summary of the tests conducted during October and November. Based upon the data collected during our survey in 1965, there appears to have been significant change in the chemistry of the stream. The pH above Verona ranged from 7.6 to 8.0 in 1964-1965. I would appreciate any information you could give me that may shed some light on the low pH values reported in your letter.

I probably have created more questions than I was originally attempting to answer. If you have such question, I would like

1967, Continued

to try to answer them. Thank you for your interest in our pollution problems."

1971

January 21 - Memo from James P. Odendahl, MWPB to office file (5.8 Verona)

"I contacted Mr. Richard Bagby with Hoffman-Taff. The consulting engineers, Black and Veatch, are still studying the waste from this operation and are trying to design an activated sludge type waste treatment system. The problems arose when the herbicide portion of the plant was sold to Nappaco [should be NEPACCO], who is making hexachlorophene. This material needs to be detoxified prior to putting it in the waste treatment plant. Mr. Bagby was not sure how close they were to finalizing plans in regard to this operation. Mr. Jim Rundell is the Vice President of Engineering for Hoffman-Taff and a letter will be sent to him regarding the progress at this plant.

The chief chemist and plant engineer for Nappaco are Ed Michaels and John Lee. It should be noted that the spill of Toluene that occurred last fall has been eliminatd by piping changes and no future problems of this sort are anticipated."

February 9 - Letter from Rundell, HT to Odendahl, MWPB.

"I wish to acknowledge your letter [letter not in MWPB - Springfield files] of February 5, 1971, concerning our Verona waste disposal problem.

The following steps have been taken to date to eliminate seepage and overflow from the lagoons:

1. A water meter has been installed on NEPACCO's water line. This has already resulted in substantial reduction in waste water volume from their operations.

2. A leaking valve on our well water line near the choline slab has been repaired reducing flow to the sewer from that source by 200 gallons per hour.

3. We have located and repaired a broken sewer line near the propionate building which was contributing groundwater to the volume.

4. A tank and sump has been installed to catch and recycle washings from the choline dryers which were previously

1971, Continued

running on the ground and contributing to contamination of the small branch.

5. As a result of the above measures being taken, we have been able to block flow from ponds two and three. We are now pumping wastes out of No. 4 lagoon back to No. 1. When pumping is complete, No. 4 will be cleaned out, new and much thicker dikes installed, and again tried for efficiency.

Black and Veatch are working on redesigning of the collection sump and have been asked to recommend more adequate sump pumps than we now have. They have asked that further studies be done on our wastes by the activated sludge method once we have eliminated Hexachlorophene and Toluene from NEPACCO's effluent. At their suggestion, we are acquiring and installing automatic pH control and recording equipment to avoid surges in our system. As in the Springfield Plant, their program calls for a study of each process in order to reduce the load and eliminate as much waste as possible by recycling or special treatment. While we are progressing well in this area, there are still two or more important changes to be made. Following these with a repeat study on the digestion with activated sludge, it appears to me that final design work will not be initiated until summertime. I will attempt to arrive at an estimate from Black and Veatch as to how long such design work might take.

We feel that the changes being made now will result in considerable improvement, which should be evident by the time of your next visit."

March 2 - Letter from Odendahl, MWPB to Rundell, H-T.

"We have received your letter of February 9, 1981, and appreciate being brought up to date on the Verona project. I will contact you in advance of my next trip to Verona and maybe we can arrange to meet thee for a joint survey. In the meantime, would it be possible to receive monthly progess reports during the design and construction phase of the treatment plant?

Your past cooperation has been appreciated and we look forward to working with you in the future."

March 26 - Letter from Thomas J. Dean, Missouri Division of Geological Survey and Water Resources to Odendahl, MWPB.

> "I stopped at the Hoffman-Taff Chemical Company at Verona on Wednesday. A surficial investigation of the lagoon area did not reveal any large quantity of effluent material seeping through the dikes. The lower most (northeast) lagoon had some seepage in the past, but no free flow of water was noted. A large quantity of a black, tarry residue could be seen being discharged through the open drainage ditch on the east side of the lagoon that flows north into Spring Creek. This black residue had nearly dispersed completely by the time it got to the road, about one-half mile to the north. I have since found out that this material is not normally discharged, but was used or contaminated in fighting a fire at the plant on the 23rd of March."
>
> I talked to Mr. Bagby on the phone on the 26th, and he thought that the west lagoon may be leaking as indicated by the presence of algae growth in Spring River to the west. I told Mr. Bagby we would dye the lagoon the next time we were in the vicinity, and try to pick up a presence of dye in the creek."
>
> Will send you a copy of a report when it is ready.

April 1 - Letter from William K. Davis, Landowner to MWPB.

> "I live north of Verona, and after you cross the railroad tracks, the first road to your left and the first house on the right side of the road.
>
> Spring River runs through my farm. Hoffman-Taff, Inc. is putting by-products from their chemical plant in the river. Some employees that work there have told me that they dump their waste material in the river after midnight.
>
> I would appreciate it if you would send someone to check the water, and I would also like to talk to them about it."

April 3 - Inter-office memo from J,FS [?] to Odendahl, Subject: NEPACCO Industries.

> "Apparently this company has bought or [merged?] with Hoffman Taff-Verona Division. We definitely need

to go by there the next time you are in the area. They have contacted Conservation Chemical Company about disposing of 4,000 gallons per week starting in April and increasing waste to 6,000 gallons by May or June. Waste consists of H_2SO_4, formaldehyde, and chlorinated phenols, maybe others.

Vice President - Edwin Michaels - At Verona
Phone: 417-498-2755

April 12 - Letter from Lightfoot MWPB to Davis.

"This will acknowledge your letter of complaint dated April 1, 1971.

This is to advise the next time our field engineer is in your area, he will investigate your complaint and try to contact you at that time."

May 10 - H-T memo.

"TO: Godrey Moll — Ed Michaels
c.c. Rick Bagby — J. J. Rattray
Milton Chamberlin — J. E. Rundell
Freylon Coffey — Davey Vanderhoof
John Lee

FROM: Ron Riggs

SUBJECT: Inspection of Verona Plant by Allan Dolph, Missouri State Water Pollution Board

May 4, 1971, the Verona Plant was visited by Mr. Allan Dolph, representative of the Missouri Water Pollution Board, to investigate an inquiry made by Mr. Davis, an owner of a dairy farm downstream from Hoffman-Taff on Spring River.

After collecting miscellaneous data such as products made, size of plant, etc., Mr. Dolph requested a tour of the plant. Following are the items that were of concern to him:

(1) The extremely high values of B.O.D.'s and C.O.D.'s that we recorded at various points in our waste streams.

(2) A pool of waste hexachlorophene just to the southeast of building 11, the toxic materials handled by NEPACCO getting into the plant tributary and NEPACCO's sloppy operations.

(3) The inafrectiveness of our chemical sewer treatment facilities and the strong odor at our sewer sump and lack of state permits for both out pilot plant and lagoons.

(4) The appearance of our in-plant tributary and the possibility of in-plant flooding with subsequent injection of sludge, toxic chemicals, etc., into Spring River (NEPACCO chemicals and waste stored below flood level). He poked down through 6" to 8" of black sludge, as he walked this stream.

(5) Boiler blowdown (hot) going into tributary--also water softener blowdown.

(6) The strange algae growing in tributary which he identified as sphaerotilus.

(7) Injection of nutrients and other chemicals into Spring River via underground seepage from our chemical sewer lagoons--causing rampant growth of spaerotilus and discoloration of the creek bed. He noticed limited growth of sphaerotilus at the first bridge below the plant.

After the tour, Mr. Dolph called John Schondelmeyer, with the water pollution board and reported his findings. Before leaving, Mr. Dolph said he would send us his recommendations by mail.

The following are verbal points and recommendations made by Mr. Dolph during his visit:

(1) Any contact we make with the Missouri Board should be in writing--to include any contacts with agencies concerned with pollution.

(2) Permits are required for any type of sanitation facility including lagoons.

(3) We should immediately hire waste treatment specialists for complete in-plant waste study.

(4) We should modify our sampling methods, i.e. refrigerated sample during transport to Springfield and more selective sampling sites.

(5) We should install baffles between our lagoons so as not to short circuit the lagoons.

(6) We should contact the Crowder Waste Water Treatment School at Neosho for possible help in analyzing our wastewater content.

(7) Removal of any high temperature water injection into our Spring River tributary.

1971, Continued

(8) We should coat our lagoons with at least two feet of clay or bentonite----this would be dependent upon final study by Missouri Geological Survey.

A follow-up call was made to Jim Odendahl (board representative who visited the plant three months ago) Friday, May 7th. He said he would meet with us the 18th, 19th or 20th of May and requested that we have a timetable outlined for design, construction, and startup of our final chemical waste treatment facilities."

May 12 - Inter office memo, MWPB, from Allen D. Dolph to Odendahl.

"The lagoon or lagoons treating the industrial wastes from this site appear to be leaking, evidenced by bottom deposits and growths in the branch to the east and Spring River to the west.

The NEPACCO Division appeared to be a rather sloppy operation. There was evidence of a spill of hexachlorophene on the ground adjacent to the small branch running through the plant. Only a few pounds, no estimation of amount. The Hoffman-Taff people have been after them about sloppy procedures.

The Hoffman-Taff sanitary treatment facility apparently serves only as a holding basin. It was inoperative at the time I was there. It had been foaming over the sides and onto the ground. According to Ron (the Plant Engineer) this facility sometimes receives slugs from NEPACCO with a pH of around 13.

I measured (guess estimate with a stock) the sludge in the branch and thought it to be about 12 inches deep in spots.

There were lush, biological growths in Spring River just west of the plant, as well as bottom deposits. There were also growths at the bridge north of the plant, but bottom deposits had diminished.

The river above the plant appeared to be in good shape."

May 24 - Letter from John W. Whitfield, Geologist, Missouri Division of Geological Survey and Water Resources to Lightfoot, MWPB.

1971, Continued

Subject: Hoffman-Taff Chemical Plant at Verona, Missouri

"As you know, there is some question as to whether the sewage lagoons for the Hoffman-Taff Chemical Company are leaking and contaminating Spring River. Last week I dyed the large lagoon and placed charcoal packets at four locations along Spring River. There is a point at Spring River in which algae begins to grow. This is the suspected place where lagoon leakage may enter the river. Two dye packets were placed upstream from this point and two below. Water samples will be obtained from Spring River to see if nitrate and chloride content increases. I will let you know the results next week."

[See Figure A-1 which was enclosed with letter.]

May 28 - Letter from John W. Whitfield, Missouri Division of Geological Survey and Water Resources to Ronald B. Riggs, H-T.

"I have completed tests on the charcoal packets placed in Spring River. The packets produced no discernible trace of dye.

Water samples obtained in the river also tested normal.

It is difficult to get reliable information on one set of charcoal packets, as a standard is needed to measure against. I would like to re-dye the large lagoon and place packets in Spring River and Mr. Evans spring for a period of several months. The packets would be changed every one or two weeks.

By extending the test period over this length of time and testing the packets as they are received, more conclusive results can be obtained than from just one set of tests.

If you are draining your large lagoon, perhaps I could dye one of the smaller ones. I will be down that way again about the second week in June."

May 28 - Letter from Whitfield, Missouri Geological Survey to Odendahl, MWPB.

Subject: Hoffman-Taff

"I have finished running chemical and fluorometer tests on the charcoal packets placed in Spring River. The chemical tests show no traces of dye and the

1971. Continued

fluorometer readings were so low that they were inconclusive.

Quantitative tests were conducted on water samples obtained in Spring River, both upstream and downstream of the algae zone. Water samples were tested for nitrate, chloride, calcium, magnesium, and sodium content. All proved normal.

Last week when I returned to Hoffman-Taff to pick up the packets, I checked S. B. Erwins' spring, which is about two miles downstream from the chemical plant. The spring water gives off a hydrogen sulfide smell, and is precipitating a white substance near the spring opening. As to where the contaminate is coming from I could not say, but Hoffman-Taff is a suspect.

I would like to redye the lagoon and keep charcoal packets in Spring River and Mr. Erwins' springs for a period of a month or more. By changing packets every few weeks, hopefully conclusive results can be established.

On my last trip down, Hoffman-Taff was draining the suspected lagoon, so I may not be able to redye it. If so, I will dye one of the other lagoons.

If you have any ideas on this matter, please let me know."

June 14 - Letter from James R. Whitley, Missouri Department of Conservation to Smith, MWPB.

"I am writing to furnish you with a more exact location of the farm near Verona where the spring has recently become contaminated. Mr. Erwin's farm is about one mile north of the Hoffman-Taff plant, the first house west off Route P on the north side of the county road, S5, T26N, R26W.

At the time Fishery Biologist John Goddard inspected the spring and spring branch, the water was black, contained no dissolved oxygen and was extremely odorous. No living aquatic organisms were observed in the spring branch.

Today, John Goddard called to report that Mr. Ron Riggs, Hoffman-Taff, states that their lagoon systems are losing water faster than normal evaporation losses.

1971, Continued

Also, an odorous seep has appeared in a gravel bar in Spring River not far from the Hoffman-Taff plant.

Conservation Agent, Darrel Testerman, Mt. Vernon, telephone 446-3586, is familiar with the spring problem and will be glad to accompany and assist someone from your office in further investigation."

June 15 - H-T memorandum.

TO: Ronald Riggs

CC: Richard Bagby
Earl Barkley
Freylon Coffey
Walter Friedhofen
Godfrey Moll
James Rundell

FROM: Karl Faehling, Microbiolgist

SUBJECT: Spring On S. B. Erwin's Farm of Verona, Missouri

"I was requested by Richard Bagby to run a water quality analysis on a sample of spring water located on farm property two miles downstream on Spring River. The sample had a pH of 6.85 and dissolved oxygen content of approximately 1.5 ppm. Strong indications due to odor and discoloration suggested contamination by coliform organisms.

In order to confirm bacterial contamination, a sterile sample was collected for bacteriological examination. The total bacterial load, as confirmed by plate count, was approximately 65 million organisms per milliliter of water sample. Coliforme pollution was confirmed and completed by the test method outlined in the A.P.H.A. Three major organisms were isolated and classified according to their biochemical reactions -- Escherichia intermedian, Aerobacter cloacea and Paracolobactrum coliforme."

June 21 - H-T memorandum.

TO: Godfrey Moll

FROM: Rick Bagby
Ron Riggs

1971, Continued

SUBJECT: Status of Verona's Pollution Problems
Six Month Chronological Survey

1. January 21st

"Visit by Jim Odendahl, Representative of Missouri Water Pollution Board. One big concern was seepage and overflow from 3rd and 4th lagoons.

Based on checks made starting in December (by measuring increase in sump level with pump shut off) the sewer plant input was averaging 15-20 gpm.

2. January 22nd

Visit by Darrel Testerman of the Conservation Commission as a result of complaint by Mr. Davis just downstream from us on Spring River (complaint centered around white algae material in Spring River).

3. February 2nd

Started dye tests of chemical sewer. Results showed leakage in both chemical sewer drains and creek drains under V-11.

Mid-February

Survey made of each area's chemical sewer system input. Total estimated gallons agreed very closely with average as measured at sewer plant sump. (Note attached survey with comparison between past and present; Attachment #1). Plot plan of sewer system was also made.

4. February 26th

Dry choline waste disposal system in operation (in attempt to terminate source of white algae growing in Spring River).

5. March 17th

Reinforced 4th lagoon bank to help stop seepage.

6. March 19th

NEPACCO vacuum pumps put on closed loop circulation reducing flow by roughly 10 M gallons per day. Since that time, we have been able to lower the level in either the 2nd or 3rd lagoons.

1971. Continued

7. March 21st

Rich Bagby discovered rampant growth of white algae above where plant stream discharges into Spring River.

8. March 23rd NEPACCO fire!

9. March 24th

Riggs called Odendahl to report fire and March 21st discovery of algae in Spring River.

Conservation commission visited us to determine possibility of fish kill from fire residue, and Tom Dean of Missouri Geologic Survey was contacted to help determine if seepage from our lagoons was causing algae growth.

10. April 6th

Although previous attempts had been made to pump out 4th lagoon, this date marks start of continuous successful pump out into 1st and 2nd lagoons.

11. April

Several projects initiated: Order placed for sewer plant flow meter, individual area manholes, and closed loop circulation on pantoplex vacuum pump.

12. May 4th

Visit by Allan Dolph (Missouri State Water Pollution Board). Note attached letter (attachment #2). He was here as result of inquiry by Mr. Davis and stated that he would send us a copy of his reply to Mr. Davis and a list of his recommendations; we have not heard from him to date. He identified the white algae as Sphaerotilus.

13. May 5th

Pantoplex vacuum pump put on closed loop circulation reducing flow to sewer by another 2,100 gallons/day.

14. May 15th

A rancher approximately two miles downstream reported a spring running raw sewage. He asked that we investigate and we did so by catching samples.

15. May 16th #2 Lagoon practically dried up.

1971, Continued

16. May 19th

John Whitfield of Geologic Survey dyed the 2nd lagoon and inserted charcoal traps above and below our suspected seepage along Spring River.

17. May 21st

Karl Kaehling (Microbiologist with H-T) caught sterile samples of S. B. Irwin's spring. Note attached memo explaining his findings (Attachment #4).

18. Mid-May

4th Lagoon dried up enough to push bank back by 25 feet.

19. May 25th

Whitfield, from Geologic Survey picked up charcoal traps. Note report of his findings in Attachment #3.

20. May 26th

Started flow back to 2nd lagoon to keep bottom from cracking and for further dye tests.

21. June 10th

Installed Barton Flo-co meter to procure accurate measurement of sewer plant inputmeter not functioning properly. Representative will be here the 25th or 28th to lend assistance.

22. June 11th

Whitfield of Geologic Survey put more dye in 2nd lagoon and put additional charcoal trap in S. B. Irwin's polluted Spring.

23. June 11th

S. B. Irwin reported another polluted spring breaking out. He requested a tour through plant (along with Joe Crabtree, an adjoining neighbor to Irwin) to investigate rumors of H-T discharging waste through a big open pipe into Spring River. Irwin reported that same day that he was procuring services of a lab in Joplin to analyze for contaminants in his spring.

24. Week of June 15th

NEPACCO Put one vacuum pump back on open loop due to

1971, Continued

inadequate cooling for seal water. Flow increased to lagoons by roughly 1,680 g p day.

25. June 19th

Manhole project 80% complete, i.e., we can visibly check the chemical sewer flow from each area. Weirs are now being cut for installation shortly.

26. June 23rd

Meeting with Jim Odendahl (MWPB) and representatives of Black & Veatch. Meeting was for purpose of discussing timetable for final decision and construction of our chemical sewer treatment facilities.

27. Projects for near future

a) Summer engineer now in process of running pilot plant studies to determine best method of recycling propionate wastes; i.e., reduction of another 1,700 gpd to sewer plant. Concentration to 20% propionate and running across drum drier is working well - results are promising.

b) Plans are to attempt complete dryup of in-plant stream; i.e., diversion of spring above plant, dry choline cooling water to cooling tower, equipment jackets on cooling tower, etc., etc.

c) Further analysis of Area VII, VIII, and NEPACCO to determine how much of each input can be segregated and/or recycled (Attachment #1).

June 23 - Inter-office memo, MWPB, from Odendahl to file (5.8 Verona).

"On the above date I met with representatives of Hoffman-Taff and their Consulting Engineer, Black and Veatch, with regard to their industrial waste problem at the Verona plant. Attached is a list of people who were in attendance at this meeting.

This meeting was prompted in part by complaints that this office had received from the Conservation Department and Mr. S. B. Erwin, landowner, regarding spring discharges of black septic material into Spring River. Mr. Erwin was blaming Hoffman-Taff for the pollution of these springs. During June, tests were conducted by the State Geologist using charcoal packets and dyes in

1971, Continued

an attempt to trace the source of this material. These studies indicate a definite seepage from the lagoons reaching Mr. Erwin's springs.

The above items were briefly discussed and the following time schedule was agreed to by the conferees.

1. Submit plans to the Missouri Water Pollution Board by August 15, 1971, for the construction of a new sealed lagoon. Completion of this lagoon is scheduled for September 30.

2. Redesign other lagoons for waste treatment following the completion of the first lagoon, with aeration to be installed in the first lagoon by October 30.

3. NEPACCO will continue to discharge into Hoffman-Taff's industrial waste sewers under an agreement to be worked out by the two companies.

4. Interim report on the additional waste treatment needs to be submitted by January 1, 1972, which will list the date that the final waste treatment facilities will be constructed and placed into operation.

5. Samples are to be collected routinely, and following analyses, reported monthly to the Water Pollution Board: a. COD, b. BOD, c. pH, d. alkalinity or acidity, e. total PO_4, f. ammonia, g. nitrate, h. dissolved oxygen, i. total dissolved solids, j. total suspended solids.

Attached is a memorandum received from Hoffman-Taff Company listing the status of their pollution abatement program since January 21, 1971, and outlining projects to be undertaken in the future. The major improvement has been a drastic reduction in the amount of water consumed in the plant. It is Hoffman-Taff's intentions to evaporate all waste and eliminate any discharge. Supplemental heating will be used if necessary. The above time schedule will be put into a letter to Hoffman-Taff.

While dye studies indicate that seepage from the lagoons at Hoffman-Taff are reaching Mr. Erwin's springs, it is not known whether these will clear up when this seepage is eliminated. In addition, it should be noted that the City of Verona does not have waste treatment facilities and disposes of its waste with septic tanks. These could be compounding the pollution of the shallow groundwater. Further dye studies of septic tank effluents should probably be made by the

1971, Continued

State Geologist. [See State Geologist's report attached]."

June 29 Letter from Whitfield, Geologist, Missouri Division of Geological Survey and Water Resources to Odendahl, MWPB.

"Enclosed is a letter to Ronald Riggs of Hoffman-Taff, Verona, Missouri, concerning dye test results on Spring Creek. The second batch of charcoal packets had high fluorometer readings which would indicate the presence of dye. The packets were placed at 4 locations in Spring Creek and 2 springs of Mr. Erwin, who is located about 1 1/2 miles downstream from Hoffman-Taff.

There is a small creek located on the east side of Hoffman-Taff's lagoon, this creek flows to the north and enters Spring Creek about 3/4 mile downstream. I walked its entire length; it becomes pretty rank and easily detectable by the olfactory nerves. There is one location in the creek bank, 100 or 200 feet north of the Hoffman-Taff fence line that appears to be seepage from the lagoon. However, this is not a large seep and I cannot see how it would pollute this whole creek. Hoffman-Taff may not be the only culprit in pollution of the creek, as I suspect Verona has a large number of septic tanks whose effluent could flow into the Spring River alluvial flood plain and eventually end up in Spring Creek. Before a final decision can be made on Hoffman-Taff pollution, perhaps several septic tanks in the city of Verona should be dyed to see if we could pick up any traces. How acceptable the people will be to our dying their septic tanks, I don't know. Do you have any ideas or suggestions?"

June 29 - Letter from Whitfield, Missouri Division of Geological Survey to Riggs, Production Super, H-T.

"I talked to Mr. Coffey, of your Springfield office, about the procedures and results of the dye test. Mr. Coffey suggested placing another charcoal packet further upstream from the plant to get an additional background count on natural fluoroscene present in the river. I suggest that it be placed by the bridge upstream from the plant where the road, south of the plant, crosses over the river.

1971, Continued

The following are fluorometer readings that were obtained from the charcoal bags placed in the river.

May 19, 1971 - Dye placed in Hoffman-Taff lagoon; packets placed in Spring Creek.
May 25, 1971 - Packets picked up.
May 27, 1971 - Packets tested for dye trace under fluorometer.

Fluorometer readings are 0-100.

	10X
Packet 1	50
Packet 2	96
Packet 3	52
Packet 4	42

June 10, 1971 - Hoffman-Taff lagoon redyed.
June 22, 1971 - Packets picked up.
June 23, 1971 - Packets tested.

	1X	3X	10X	30X	Remarks
Clear Spring	5 44	Off Scale	Off Scale	Off Scale	On Erwin Farm
Polluted Spring	6 Off Scale	" "	" "	" "	" "

The readings are comparison readings and have no unit valve.

After the charcoal packets are removed from the river, they are placed in paper envelopes and returned to the laboratory in Rolla. The packets are opened and a portion of them poured into a glass breaker, then a reagent frees the fluoroscene from the charcoal so that it can be tested. If the dye concentration is heavy enough, a green color can be seen in the fluid. No traces of dye could be seen by visual examination on packets obtained from Springs Creek. Studies of dye tracing indicate that about .1 part per million if visible to the naked eye if the water is clear. If the water is discolored due to organic or other impurities in the water, the dye color can be masked so that it cannot be detected by the eye. A sample of the fluid is poured out of the beaker into a small test tube, which is placed in the fluorometer. Readings are then taken at various powers. These powers range from 1X, 3X, 10X and 30X. The above readings show which power was used to determine the presence of fluoroscene.

If Hoffman-Taff would care to do their own testing, you may be interested in where we obtain our supplies. Fluoroscene dye is obtained from Tyland Products, Co., 95-10 218th Street, Queens Village, New York 11429.

1971, Continued

Cost is $4.00 per pound. It is an organic commercial grade dye. The charcoal is activated coconut, 6-14 mesh, 4-685B. We get 4-pound cans from Fisher Scientific Company, Chemical Manufacturing Division, Fair Lawn, New Jersey. The reagent used to abstract the dye from the charcoal is 5% KOH in a 95% grain alcohol solution.

I would suggest that you not place any dye into the lagoons until I have completed my test.

I will be down that way again, possibly the 7th or 8th of July, to pick up the charcoal bags in the creek.

[Refer to Figures A-2 and A-3 for location of dye packets.]

July 14 - Letter from E. S. Haddock, adjoining landowner, to Odendahl, MWPB.

"I am a landowner just below and joining Hoffman-Taff on the north, I have just been contacted by them in regard to a permit application for the purpose of discharging wastewater into Spring River of which a part runs across my property, and has it badly polluted.

In my study of this application, I don't find where a joining landowner has any voice in such application, and I think they should have and also be contacted, and compensated for the damage being done.

I am anxious for them to receive the permit if all things are properly taken care of. They are nice people and I am sure things can be worked out, but Spring River is in bad shape as perhaps you already know."

July 22 - Letter from Odendahl, MWPB to Haddock.

"Your letter of July 14, 1971 has been received and your concern is appreciated.

"One of the reasons for Hoffman-Taff's contacting you was our recent meeting with them, as we are very anxious to get a permanent waste treatment facility installed as soon as possible. We believe that they will proceed immediately to correct existing deficiencies and clean up Spring River."

1971, Continued

July 26 - Memo from Odendahl, MWPB, to file (5.8 Verona).

> "On the above date, I met with Freylong Coffey, Hoffman-Taff, and Richard Quinlan, Black and Veatch, to review their preliminary design for interim waste treatment facilities. Their present plans are to construct a batch treatment plant to neutralize waste and sludge settling. The sludge will be placed in concrete-lined sand drying beds with a total of one year's storage with the clarified effluent discharged to two-lined lagoons. These lagoons will be aerated to assure complete waste mixing prior to discharge to the next treatment step. They propose to use an under-drain system beneath the lagoons for leak detection. Plans and specifications for the initial construction are to be submitted prior to August 15, 1971. Preliminary approval of the proposal was given on July 26, 1971."

August 3 - Letter from E. S. Haddock, adjoining landowner,

to Odendahl, MWPB.

> "I am enclosing a piece from our paper [article not in file] I thought might be of interest to you. What seems strange about this report is the fact that people, I am sure know where this filth is coming from; they still make soft for guilty party.
>
> I am the first landowner below them, and if you or Mr. Whitfield will take a walk with me down a ditch in my field, there would be no use for anyone to pull their hair any longer, for any ten-year-old child surely could tell from the odor from the plant and from the ditch also.
>
> There are some that would like to blame the town of Verona for it, but the Springs on Erwin's farm that are so badly polluted, I hauled water from them and also from the River as far back as 1934 to drink, and Verona was here at that time with a much larger population that it now has. Water as clear as crystal.
>
> I don't think they will ever be able to control the thing as bad as I would like for them to. The lagoons they now have and are building are not near high enough, that if the walls of them, for I have seen the water 6' feet right where they are the first flood comes I will get the complete load right through my field, and the River will be pollution clear into Kansas.

1971. Continued

> I suppose they obtained a permit to go ahead and dump their filth as in the past. There is a great need for something being done and fast.

August 10 - Status Report on Dye Tracing at Verona, Missouri by Whitfield, Missouri Geological Survey. [Report is appended - although inconclusive the Hoffman-Taff lagoon complex is suspect.]

August 10 - Letter from Freylon B. Coffey, H-T Pollution Control Coordinator, to Odendahl, MWPB.

> "This letter is to advise you of our latest plans for pollution abatement at our Verona Plant.
>
> We plan to comply with your request that we provide lined, aerated lagoons (items 1 and 2 of your July 26th letter) by installing temporary facilities. We will have a temporary liner in our largest lagoon by August 14, 1971. Aeration will be provided by the present aeration tank before the water flows into the newly lined lagoon. If additional aeration is required, we plan to recycle water from the outlet of the lagoon back to the aeration tank. The lined lagoon will discharge to the river and all unlined lagoons will be abandoned.
>
> These temporary facilities are being provided primarily to afford more time to adequately plan the permanent facilities. As plans now stand, we expect to provide you with plans for permanent facilities by September 30. The permanent facilities should be completed by December 30, 1971."

August 16 - Letter from Odendahl, MWPB, to Coffey, H-T.

> "We have received your letter of August 10, 1971, and conclude that you are proceeding well ahead of the time schedule agreed to during our meeting on July 26, 1971. This is encouraging and we hope you can continue this progress and eliminate subsurface seepage.
>
> By now you will have received a copy of the State Geologist's report dated August 10, 1971, outlining the results of the fluoroscein dye studies conducted earlier this year. Mr. Erwin has recently contacted

1971, Continued

this office again and reported additional spring-like discharges forming on his farm. Any steps Hoffman-Taff can take to expedite completion of the planned waste treatment facilities will be appreciated."

August 16 - Letter from Odendahl, MWPB to S. B. Erwin, downstream riparian landowner with polluted spring.

"I am writing to inform you that we are continuing to work with Hoffman-Taff in an attempt to expedite construction of new waste treatment facilities which will be designed to prevent seepage of material into the groundwater aquifer. At the present time, Hoffman-Taff is proceeding as rapidly as possible with the construction of new lined lagoons, and should have plans for their complete waste treatment facility in our office by September 30. They will beat their approved time schedule by some 30 or 60 days.

We hope that the completion of the lined lagoons and elimination of subsurface seepage at Hoffman-Taff will result in improvement of the water quality of the discharge from the springs on your farm. However, as the State Geologist pointed out in his report dated August 10, there is no assurance that this will in fact occur.

The seriousness of the problem existing in Spring River at Verona cannot be overemphasized. We recognize that there has been serious detriment to the water quality and that the conditions existing on your farm are, at best, very bad. You can be rest assured that we will do everything that we can to make sure that steps now being taken will not further aggravate the existing situation."

August 16 - Letter from Jack K. Smith, Executive Secretary, MWPB to Jerome H. Svore, Regional Director EPA.

"Enclosed are copies of pertinent correspondence between this office and Hoffman-Taff, Inc., Verona, Missouri. We are sending you this for your information in case you are contacted in regard to the problem at Spring River. It is an extremely bad situation and one that the State Geologist has been unable to define completely. It should be noted that for a period of 2-3 years, we had no problems with this industry. What circumstances caused this sudden outbreak of polluted springs after a prolonged period of no problems is not known. We hope that the steps being

1971, Continued

taken by the industry will alleviate groundwater contamination and result in improved water quality."

August 17 - Letter from Odendahl, MWPB to E. S. Haddock.

"I want to thank you for sending the newspaper clipping from the local paper regarding the pollution problem in Spring River at Verona, Missouri.

We are aware of the very serious problem which exists in the spring-like discharges on Mr. Erwin's farm. We are also aware of the problems that have occurred since January 1 at the Hoffman-Taff plant. They are presently placing into operation new lined lagoons, which will eliminate leakage into the subsurface, and are to submit to this office by September 30 their plans for complete waste treatment facilities. Hopefully, as soon as this subsurface seepage is eliminated, there will be a noticeable improvement in the spring-like discharges. However, no one from this office or the State Geologist's office is about to give any definite assurances that this will happen. Once this type of situation breaks out, it may continue for years. It may also be aggravated by the septic tanks in the town of Verona.

We appreciate your concern and want to assure you that we are maintaining continual contact with the industry in an attempt to correct this situation."

September 1 - Office memo, MWPB, from Gilman Wommack to Odendahl.

Subject - Hoffman-Taff, Verona

Sample No.	Description	COD, mg/l
281	Spring River at low water bridge Erwin Farm	5
282	Spring River at bridge just below Hoffman-Taff	0
283	Spring River at business 60 bridge	0
284	S. B. Erwin farm spring	148
285	Spring River 1 mile north of Verona	1
286	Sample of Hoffman-Taff effluent	35,000

1971, Continued

[Memo does not indicate date samples were collected.]

September 3 - Letter from Smith, MWPB to John W. Lee, NEPACCO.

"We have been informed that as of 5:00 p.m., September 7, 1971, your waste material will no longer be accepted by Hoffman-Taff for treatment. Please advise this office immediately as to your plans for waste treatment."

September 7 - Office memo, MWPB, from Ione to Odendahl.

"Mr. John Lee of NEPACCO called September 7, 1971 and stated in reply to Jim Odendahl's letter of September 3, 1971, that NEPACCO would have no discharge of any kind until their problem with Hoffman-Taff is resolved. Mr. Lee stated it would take three to four weeks to resolve the problem."

September 9 - Letter from Coffey, H-T, to Odendahl, MWPB.

"As indicated in our phone conversation on September 3, 1971, we would like to apprise you of the fact that as of 12:00 Noon Wednesday, September 8, 1971, Hoffman-Taff, Inc. will discontinue acceptance and/or treatment of all liquid waste materials produced by the plant of NEPACCO operating within our plant at Verona, Missouri. After the date NEPACCO will be solely responsible for all treatment and disposal of such wastes.

If you have any questions, please do not hesitate to contact me."

September 17 - Office memo, MWPB, from Odendahl to Verona file and JKS [Jack Smith].

"John Lee, Manager of NEPACCO, called and asked about the feasibility of discharging 3,000-4,000 gallons per day of waste to the Aurora STP for treatment. Estimated strength as follows:

600 #/day NaCl & $Na_2 SO_4$
3,000 #/day glycol = Approx. 775 #/day of carbon
300 ppm chlorinated phenols

The school at Neosho is running treatability studies and Aurora has retained the firm of Hood-Rich to advise them. I have warned Mr. Lee that this waste could very easily

1971, Continued

upset the treatment plant and that we could only consider this as an interim measure. Results of the tests are to be submitted and we get a final shot at approval of this procedure."

[The author telephonically contacted the consulting firm of Hood-Rich on February 12, 1981 and learned that the firm had advised the town against accepting NEPACCO waste.]

September 20 - Letter from Lee, V-P NEPACCO to Odendahl, MWPB.

"We have reviewed our plant affluents and, as we discussed Friday by phone, intend to split our present waste stream of 6,000 gallon/day into four separate streams, each with its own treatment:

1. Vacuum loop water - 2,000 gallon/day, contaminates are a trace of toluol, some glycol, ammonia (pH 8.1), no inorganic salts. BOD, COD's pending, chlorinated phenols less than 300 ppm. Present test at levels of 5,000 gallon/acre show increased growth of grass. Proposed irrigation site is a one-acre plot near the plant containing a minimum* of six feet of top soil over gravel.

2. Organic waste stream - separated and removed from site for contract incineration. [This is assumed to be still bottoms--six loads consisting of about 18,500 gallons which were hauled out by Bliss between February 26 and October 14, 1971.]

3. Saturated brine solution - 1,000 gallon/day containing a mixture of sodium chloride and sodium sulfates, (total inorganic salts would be approximately 3,500 lbs.) and 1,000 lbs. of diglycols. This material would be removed from site, contract pending.

4. General waste stream - 3,000 gallon/day containing approximately 3,000 pounds of mixed glycols, 500-600 lbs. of inorganic salts and less than 300 ppm of chlorinated phenols. Full affluent profiles pending.

BOD compatibility tests are presently being run on waste stream #4 and the Aurora influent at dilution ratios of 3,000:650,000. The 3,000 gallon NEPACCO affluents would be discharged over a 20-24 hour period or during minimum flow periods of the Aurora plant.

* [Author's comment - it is doubtful that the irrigation site in this flood plain had six feet of top soil. The groundwater is only a few feet below the surface.]

971, Continued

We also suggest a gradual acclimation of the Aurora plant to the NEPACCO wastes, i.e. initial discharge to be 500-1,000 gallon/day, to be gradually increased to the maximum of 3,000 gallon/day/5 day work week.

We intend to use the facilities of the Neosho Water and Wastewater Technical School to monitor the Aurora plant affluent for any adverse effects, due to the added load of the NEPACCO stream.

I will be in touch by phone as soon as the biological testing is complete. I look forward to a favorable review from your office on the disposition of stream #4, as it is my intention to resume plant full operation on or about September 27, 1971."

eptember 27 - Letter from Odendahl, MWPB, to Lee, NEPACCO.

"This is to confirm our telephone conversation of September 23, 1971, and to approve the use of irrigation for the vacuum loop water. This is for a period of not more than 120 days without additional approval and for approximately 1,000 gallons per day of wastewater. As we discussed, a hose will be used to spread the liquid on approximately one acre with the point of discharge changed as frequently as necessary to prevent runoff or ponding, and to use all the available disposal area.

If you have further questions, please advise."

tember 28 - Office memorandum, Missouri Department of Conservation, from

rtt H. Fuchs to James Whitley.

"On September 15, 1971, I investigated a pollution complaint about the Spring River from Mr. E. S. Haddock of Verona. Mr. Haddock accompanied me on the investigation.

Location: Mr. S. B. Erwin farm - T26N, R26W, S5. About 1 1/2 miles downstream from Verona.

Time: 6:40 p.m. D.S.T.

Water Temperature: 71° F

Specific Conductance: 400 micromhos

pH: 7.5

ued

Observations: The river was checked at a low water crossing downstream from several springs having a black, odorous discharge. The odor was still strong at the crossing. The river bottom contained excess amounts of organic material. Sewage fungus was present. The benthic fauna was dominated by red chironomids (blood worms) and by the snail Physa. The river was judged to be in an advanced state of organic pollution at this location.

Location: Mr. Colman Johnson farm - T26N, R26W, S20. About 1/2 mile upstream from Verona.

Time: 7:10 D.S.T.

Water Temperature: 67° F

Specific Conductance: 370 micromhos

pH: 7.9

Observations: The river bottom was clean and free of any excess organic deposits. The benthic fauna was diverse and included several types of mayflies, caddisflies, true flies, beetles, and crayfish. Mayflies and crayfish were especially abundant. The river was judged to be unpolluted at this location.

Mr. Haddock was especially concerned about possible effects of effluent from Hoffman-Taff upon his livestock. By copy of this memorandum, I am asking the Missouri Water Pollution Board to send Mr. Haddock any chemical information they might have on this subject. His address is Mr. E. S. Haddock, Spring River Shelling Company, Verona, Missouri 65769."

- Letter from Coffey, H-T, to Odendahl, MWPB

"Enclosed is a sketch [See Figure A-4] showing our plans to dispose of waste water by irrigation at our Verona plant.

As shown in the sketch, we will pump neutralized, aerated wastewater to a plot on the west side of our plant. The plot has been plowed and disced to help aerate and maintain the porosity of the soil. We will spray the water onto the area with conventional sprinkler heads. Our volume will be about 10,000 gpd and the area is about 3 acres. The area is nearly flat so we should not have any difficulty with pooling or runoff.

We expect to use this disposal method, as long as there are no adverse effects on neighboring water supplies,

- 1971, Continued

until we can develop a better wastewater t
As indicated in previous discussions, this
to 24 months from now.

If you have any questions, please call me.

September 30 - Letter from Odendahl, MWPB, to Haddock.

"We have received a copy of a memorandum fr
Department of Conservation requesting that
of any possible effects the discharge from
could have on your livestock. Please be adv
Hoffman-Taff is presently installing a waste
system which will prevent any discharge to S

If you have further questions, please advise.

September 30 - Office memo, MWPB, JPO [Odendahl] to Verona

"Freylong Coffey called 9-27-71 and reported
tests of the samples split between Bruce Will
Hoffman-Taff had 60 mg/l - $SO_4^=$
PO_4 - 1.02 mg/l
John Hill said we should have the results of t
soon."

September 30 - Letter from Bruce Williams Laboratories, Jop

Attention: Charles S. Decker.

RE: Hoffman-Taff
Verona, Missouri

"941881 First Lagoon Cell 8
941882 Spring #1 S. B. Erwin Farm 8
941883 Spring #2 Next to Low Water Bridge 8

		941881		941
Calcium Propionate		5268.	PPM	618
Choline Chloride		5,340	PPM	97
Hexachlorophene		122	PPM	<2
Tri Chlorophenol	None Detected	<5	PPM	<5
Methanol	None Detected	<5	PPM	<5
Toluene		<5	PPM	<5
Sulphates SO		10,580	PPM	115
Phosphates PO_4		0.74	PPM	1

* None Detected."

1971, Continued

October 1 - Office memo, MWPB, from CSD [Decker] to Odendahl and Smith.

"Mr. Erwin would like a copy of this data [preceeding entry], and the COD information collected on the Hoffman-Taff lagoon, Spring River and his farm springs.

It would appear that the calcium propionate and choline chloride data implicates Hoffman-Taff lagoon as leaking to underground acquifers.

Hoffman-Taff also should be advised of results."

1971

October 1 Office memo, MWPB, from Odendahl to Verona file.

"On September 10, 1971 a meeting was held with representatives of Hoffman-Taff regarding their waste treatment problems. Present - John Lee, NEPACCO, Godfrey Mall, H-T, Freeyon Coffey, H-T, Jack Smith, WPB / JPO.

The program outlined consists of completion of Batch Treatment units by January 1, 1972 and complete waste treatment by Spring, 1973."

October 18 - Letter from Odendahl to Erwin.

"Enclosed is a copy of the report we received from Bruce Williams Laboratory on their analysis of samples collected by Engineer Steve Decker on August 16, 1971. If you have any questions, please feel free to call at any time."

October 18 - Letter from Odendahl to Coffey, H-T.

"We have reviewed your letter of September 29, 1971 and conclude that the irrigation system, as outlined, should function satisfactorily providing that the soils are adequate to absorb the waste and runoff into Spring River is prevented. It is our understanding that this is an interim measure and this should be considered our approval of the proposal.

Attached you will find a copy of the data submitted by Bruce Williams Laboratory on their analysis of samples collected by Engineer Steve Decker on August 26, 1971. If you have any questions regarding these results, please contact me direct.

nued

I plan to be in the Verona area during the week of November 8, 1971 and will plan to contact you so that we can meet at the Verona plant."

- Excerpts from "Report of Reconnaissance on Spring and Elk River

e November 1971" by USEPA, Region VII, SVAN, Tech Support Branch,

stigations Section, November 8, 1972.

[In November of 1971 the author and an aquatic biologist conducted a two-week reconnaissance in the area. This reconnaissance included an examination of selected stations on the Spring River both upstream and downstream from Hoffman-Taff. The situation with regard to Hoffman Taff, the river and downstream landowners, was not known to the field team at the time. Reports of visual observations made at the time (November 2, 1971) working from upstream from Hoffman-Taff to downstream are as follows. Locations of the station numbers may be found in Figures A-5 and A-6.] D-5 D-6

Station No. (Stream Mile)*	Observation
S.R. 210 (97.12)	"Privately owned fish hatchery here, fishing on a commercial basis. The springs just upstream from the hatchery form the head waters of the river."
S.R. 205 (95.36)	"Bridge across Spring River would be good sample point to determine background levels upstream from Hoffman-Taff. Biologist found clean water organisms here."
S.R. 200 (94.84L)**	"Recently laid 8 in. vitrified clay pipe at this point. No flow at time of observation. No odor or visible stream damage in vicinity of pipe to indicate an organic discharge. Pipe is believed to belong to Hoffman Taff."

e measured upstream from mouth of river.

rs to left bank of river when facing upstream.

95 "Unnamed tributary (not shown on map)
L)** enters Spring River at this point. This tributary was walked upstream to the fenced property line of Hoffman Taff. A pipe runs from within the property to the stream. Although there was no flow from the pipe at the time of observation, the noxious odor about this tributary indicated a waste discharge."

90 "Biological examination point--Sphaerotilus
) Supp. Fungi here, no bottom organisms found here. Pollution believed to be due to Hoffman Taff. There is a bridge at his location. Would be good sample point to determine effect of Hoffman Taff."

85 "Biological examination indicated benthic
) community about 2/3 recovered."

80 "Biological exmination indicated stream
) still in recovery."

75 "Biological examination indicated good
) quality water--full recovery."

memo, MWPB, from Keith S. to Verona file.

dendahl and myself visited the Verona plant to
: the irrigation system. All wastes go to the
:ion field except for cooling water, which is
-ged separately.

ste is applied at a rate of 4-6 gal/min, and a
)f 6,000 gal/day.

-igation system is moved after .2" has been applied.

)lans are to provide storage for periods of cold
: weather."

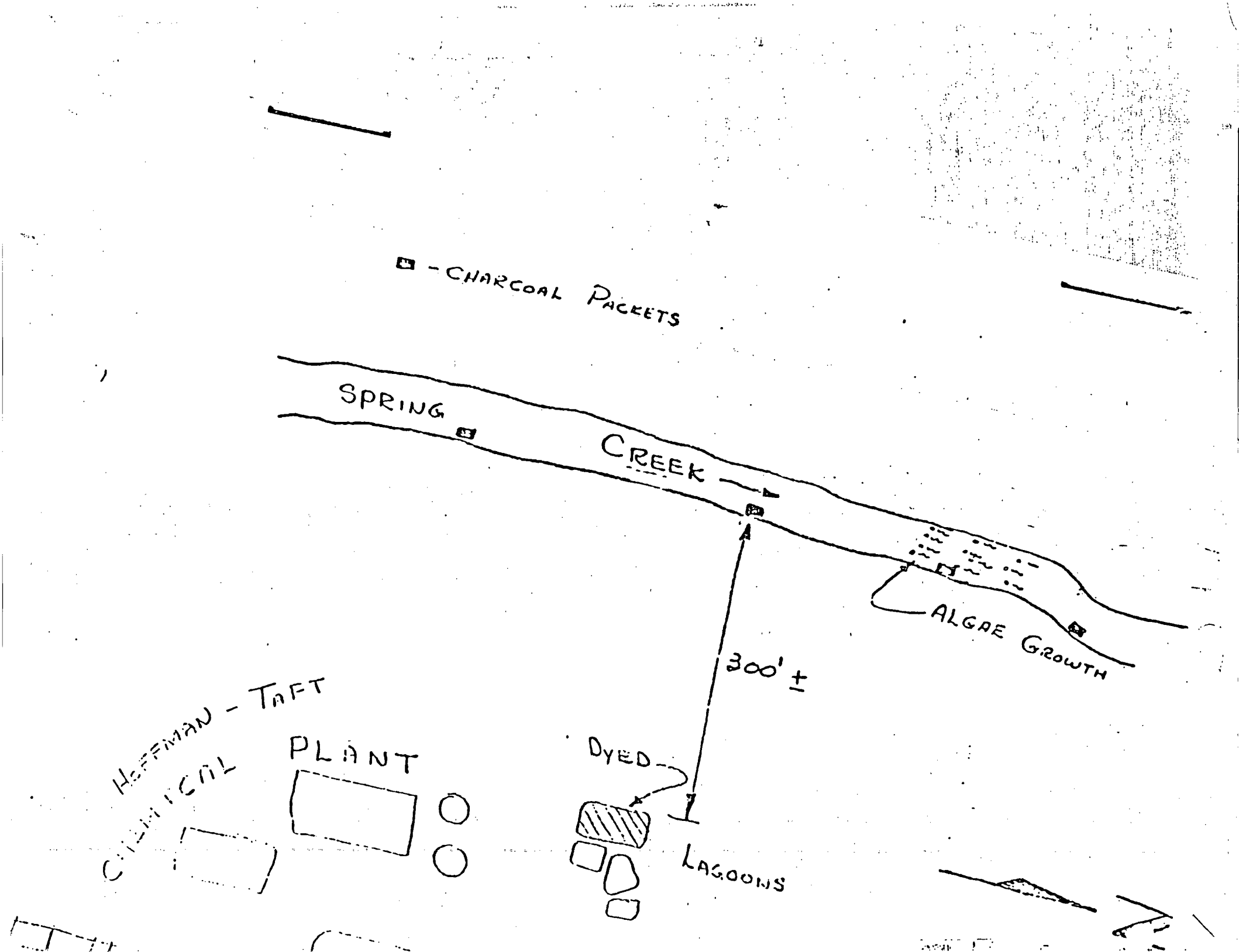
from Odendahl, MWPB, to Coffey, H-T.

etter will confirm investigation of your irri-
system by Keith Schardein and myself on November 9,
Our investigation indicated that the system installed
tioning satisfactorily and was preventing further
discharge into waters of the state. We will
ate your keeping us informed of any adverse effects
the irrigation of your waste, if any.

bank of river when facing upstream.

1971, Continued

I appreciate the courtesies extended to us during our survey and if we can be of any assistance at any time, please advise."


■ - CHARCOAL PACKETS
SPRING
CREEK
ALGAE GROWTH
300' ±
HOFFMAN - TAFT
CHEMICAL
PLANT
DYED
LAGOONS

A-2

4 - CHARCOAL PACKETS PLACED IN SPRING CREEK MAY 19, 19

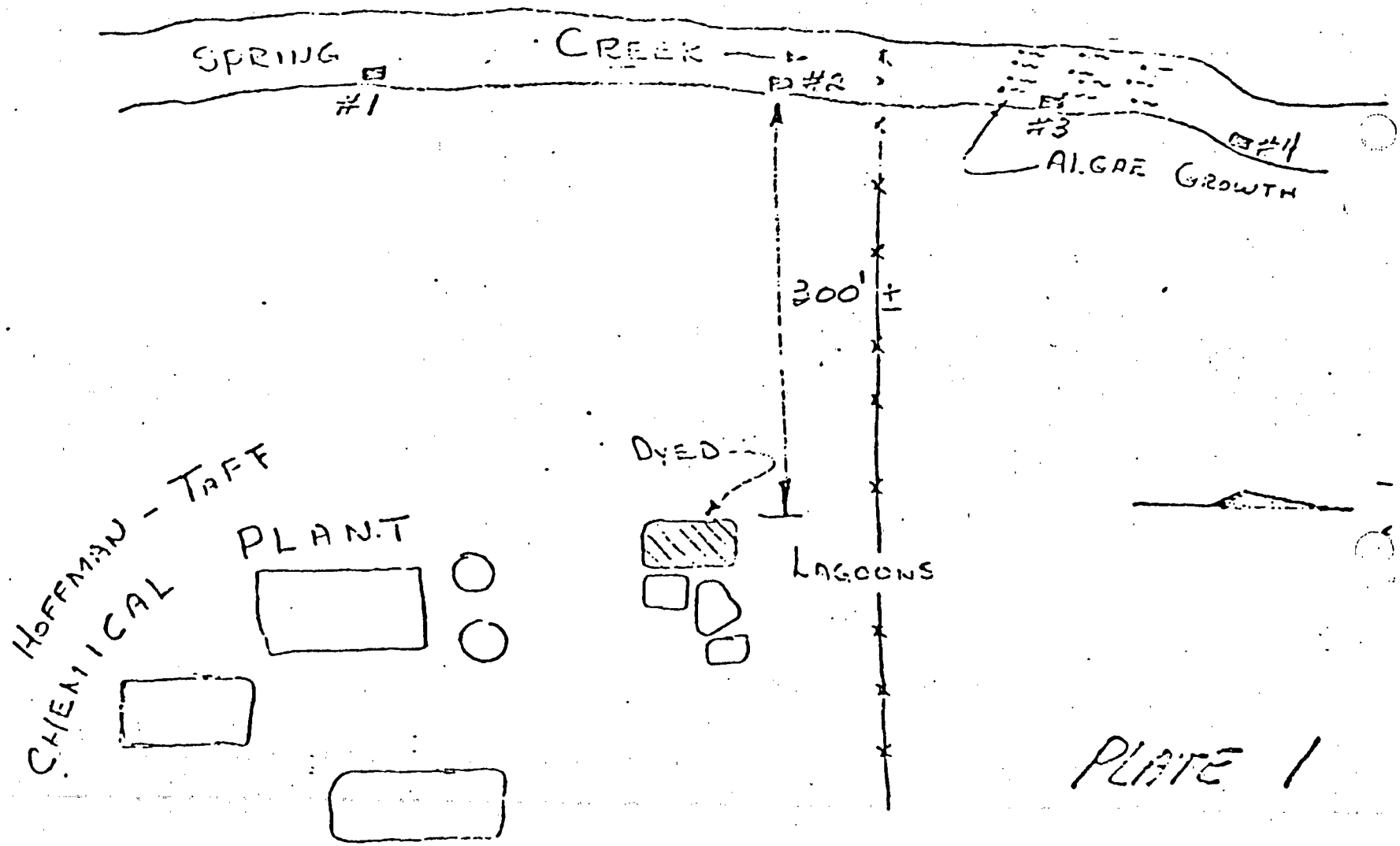


FIGURE A-2 - MAP 1 ACCOMPANYING JUNE 19, 1971 ENTRY.

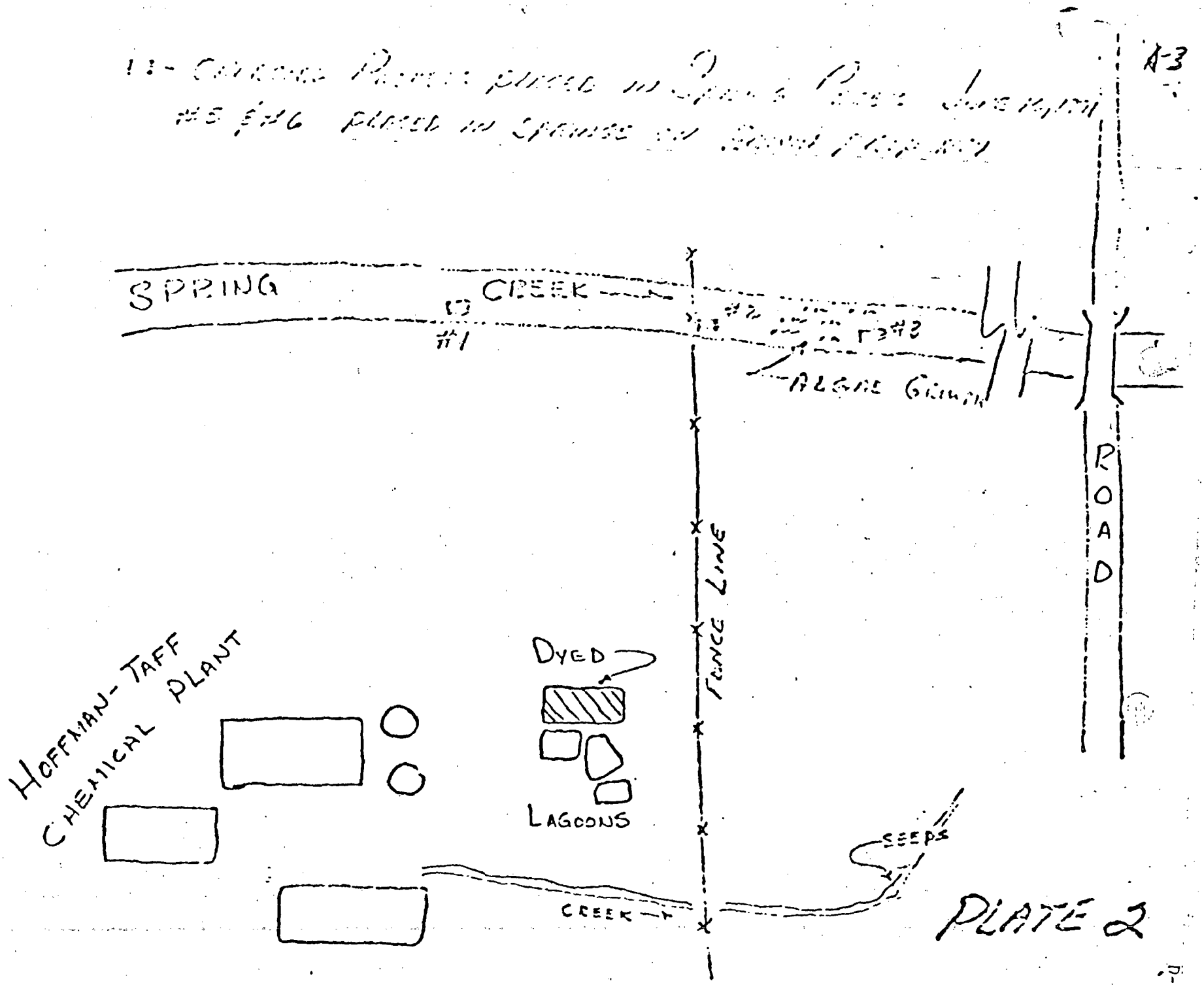

SPRING
CREEK
#1
#2
ALGAE GROWTH
ROAD
FENCE LINE
HOFFMAN-TAFF
CHEMICAL PLANT
DYED
LAGOONS
SEEPS
CREEK

PLATE 2

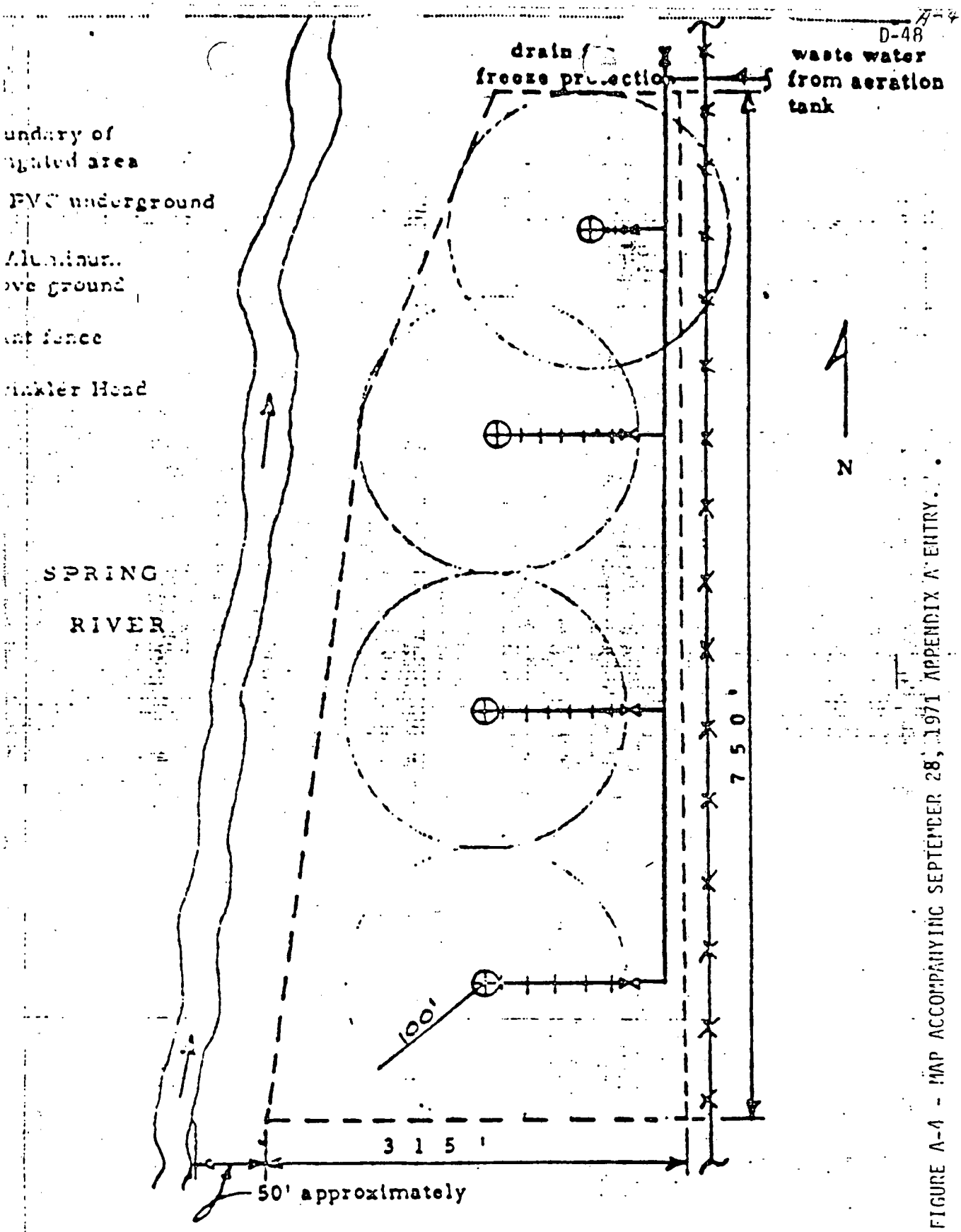


FIGURE A-4 - MAP ACCOMPANYING SEPTEMBER 28, 1971 APPENDIX A ENTRY.

Figure 1: Disposal of waste water by irrigation at Hoffman-Taff's Verona, Missouri Plant

F. B. Coffey
4-28-71

STATUS REPORT ON DYE TRACING AT VERONA, MISSOURI

On May 19, 1971 one of the lagoon cells servicing Hoffman-Taff Incorporated was dyed in an attempt to determine if the cells were leaking and contaminating Spring Creek. Three pounds of fluorescein dye were placed in the cell for the purpose of tracing lagoon fluids. Charcoal bags (unattended dye collectors) were placed at four locations in Spring Creek to absorb dye that would enter the creek. The charcoal packets were left in the creek one week and then returned to Rolla, where the charcoal was washed in a KOH-alcohol mixture to release the dye. The KOH-alcohol mixture was filtered, and the filtrate observed under the fluorometer for fluorescein content. This one set of test results gave low fluorescein readings (see May 25th results). The readings indicate very little fluorescein in the water.

The lagoon cell was redyed with three pounds of fluorescein on June 10. Charcoal bags were again placed at various locations in Spring Creek and springs located on the S. B. Erwin farm to determine if dye was coming through. On June 23, July 6, and July 22 the charcoal bags were tested for fluorescein content; new bags were installed to replace the bags tested. Residue extracted from the bags were placed under the fluorometer and in nearly all cases readings were so high they were off the scale of the fluorometer. Each time the bags were replaced in the creek one bag was placed upstream of the lagoons to measure natural fluorescein content of creek water. Three of the bags placed upstream gave high natural fluorescein readings (site 1); the exception was the bag placed in the creek on May 19 which gave a reading of 50 on 10X power scale. Another packet was placed approximately one-half mile upstream of the lagoon in July by Hoffman-Taff officials. The purpose of this bag was also to determine the amount of natural fluorescein in the creek at a point further upstream. Residue extract from this packet also registered so high it was off the scale when placed under the fluorometer. This would indicate high natural fluorescein content in the water. Charcoal packets were placed in the springs suspected of contamination on the Erwin farm approximately 2 miles downstream from the Hoffman-Taff Chemical Plant. Another packet was placed in what appears to be an uncontaminated spring a short distance from the apparently contaminanted spring. Charcoal bags picked up July 6th and 22nd, registered off the scale on both of these springs.

Normally during dying operations the fluorescein content in the charcoal bags will raise sharply as the dye comes through and then drop as dye percentages in the water drop. In the case at Verona, fluorescein content has maintained a very high level in both natural water and suspected contaminated water. These high readings may be due to climate and seasonal changes affecting the water, contamination of creek water further upstream or perhaps the chemicals in the cell that were tested may alter the dye. Usually when the fluorescein readings are high dye can be seen visually in the charcoal filtrate. Dye could not be seen visually or by ultra-violet light in any of the bags at Verona.

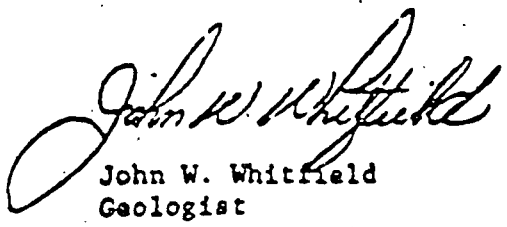
Because of the constantly high fluorescein readings obtained in the charcoal bags over the summer season in Spring Creek above and below the lagoons, I have not been able to establish any kind of test trend or conclusive evidence to date.

SUMMARY

There is no question that springs on the Erwin farm and Spring Creek visually show evidence of pollution. Circumstantial evidence points strongly toward the Hoffman-Taff lagoon complex. These cells receive liquid inflow daily, but do not discharge effluent.

The septic tanks and other means of waste disposal used by residents of Verona over many years can also be suspected as a contributor to pollution of Spring Creek valley. Pollution by discharge from septic tanks in an urban-suburban complex is common place in Missouri as elsewhere.

To conclusively pinpoint the guilty party or parties that cause the pollution cannot be done with the available test data or water sample analysis. The lagoons will be redyed later this fall after the climate conditions have changed. Hopefully, by this time the high fluorescein content in the water will have dropped and test patterns can be established. Different types of dye less sensitive to natural or chemical influences, but reliable for dye tracing will be used.



John W. Whitfield
Geologist
Engineering Geology Section
Missouri Geological Survey
August 10, 1971

cc: S. B. Erwin
Verona, Missouri

Ronald D. Riggs
Hoffman-Taff
Verona, Missouri

Joe Boyle, Reporter
Springfield Leader and Press
Springfield, Missouri

Mayor, City of Verona
Verona, Missouri

AT VERONA, Mo.

Spring River at Verona Mo. — J.W. Whitf

NW¼ Sec. 17, T26N, R2W, Lawrence Co. — 5-26

#1 Above lagoon (600' between locations)

#2 Down-stream from lagoon of Hoffman-Taft Chemical Plant (Hexachlorophene, Toluene, Calcium propionate, etc. produced)

Anal. No. 7023

	#1 above	#2 below
SO_4	Low	Low
Cl	Low	Low
NO_3	Trace	Trace
Ca	55.6	63.0
Mg	1.7	1.7
Na	3.3	4.5
K	1.2	1.3

M.E. Phillips
E. Lynge
6-17-71

VERONA FLOUROMETER READINGS

MAY 19, 1971 - DYED - 9 lbs

MAY 25 PICK UP BAGS	SITE 1	SITE 2	SITE 3	SI
	10X	10X	10X	1
	50	96	52	4

JUNE 10 RE-DYED 9 lbs

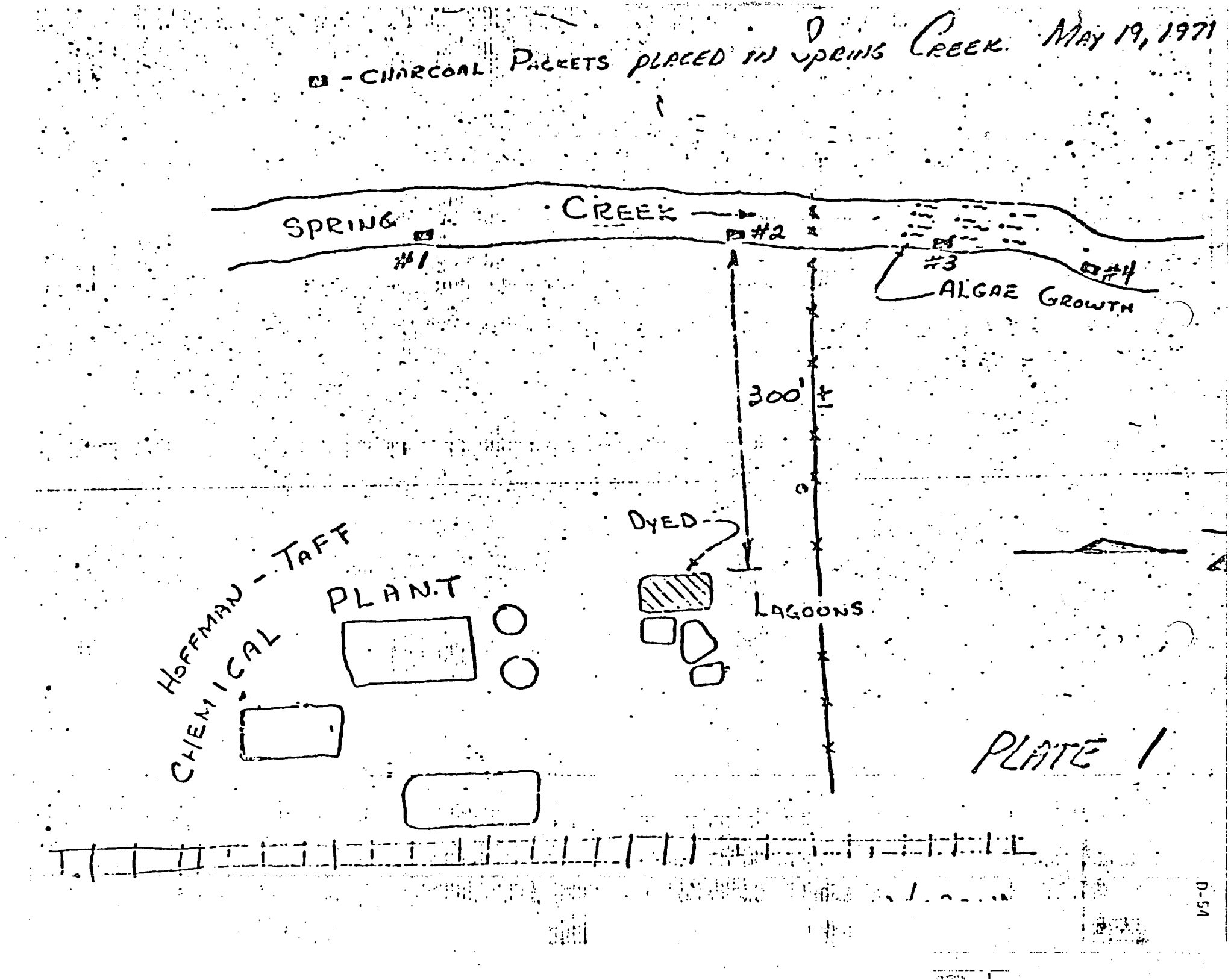
JUNE 22 PICK UP BAGS	SITE 1		2	3	4	CLEAR SPRING		POL. SPR.
	1X	8X	1X	1X	1X	1X	8X	1X
	85	OS	OS	OS	OS	44	OS	OS
JULY 6 " " "	1X 82	8X OS	1X OS	1X OS	1X OS	1X OS		1X O
JULY 23 " " "	1X OS		1X OS	1X OS	1X OS	1X OS		1X O
	0							

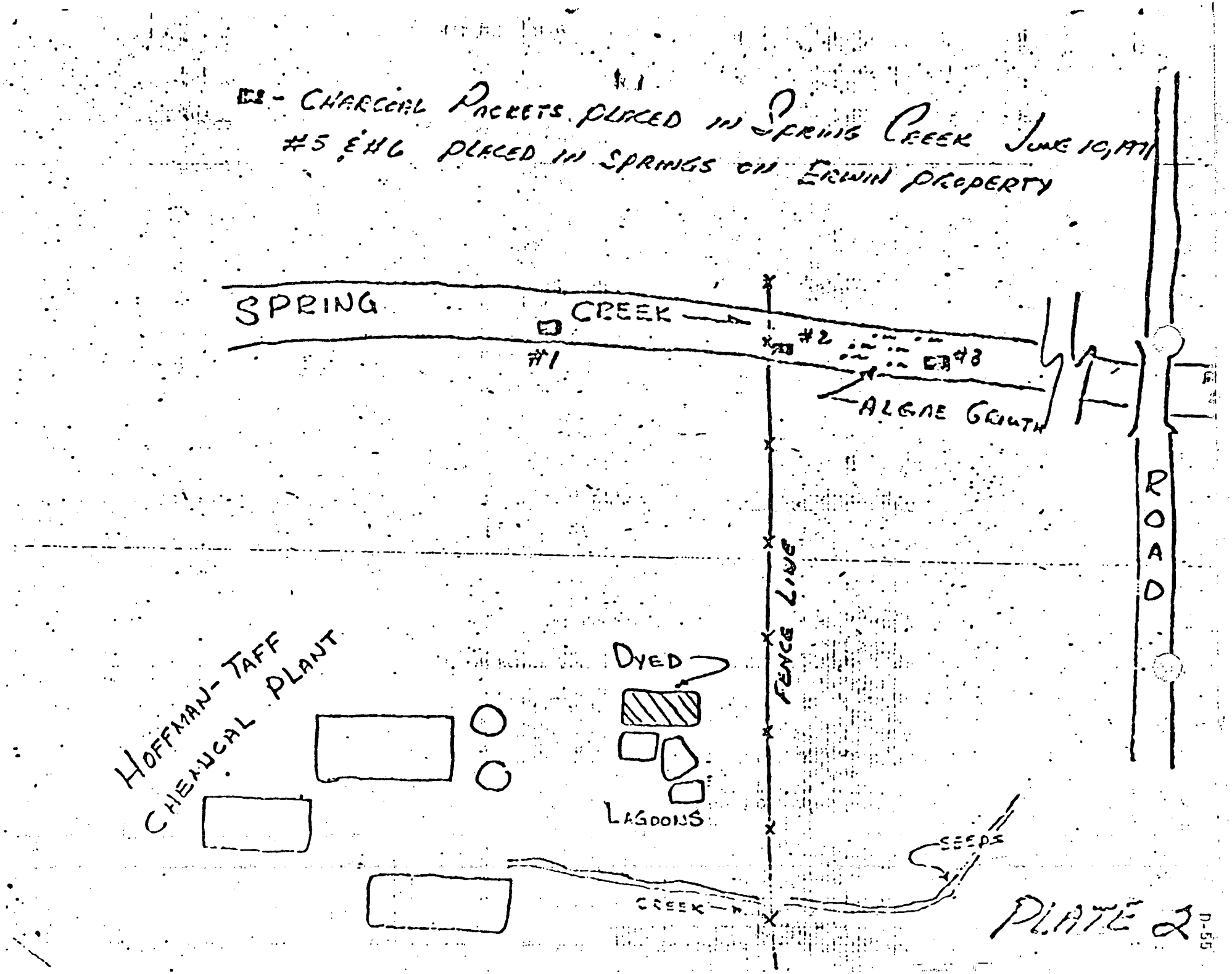
BACKGROUND BAG: PLACED JULY 6
TESTED JULY 28
1X
OS

OS - MEANS FLOUROMETER WENT OFF SCALE

FLUOROMETER READINGS USING ROTAMAN FILTER

	1X	3X	10X	30X
JUNE 29				
SITE 1	1	4	13	33
2	3	6	17	41
3	2	4	11	26
4	2	3	15	25
GOOD SPRING	1	2	5	10
BAD SPRING	2	2	4	11
JULY 6				
SITE 1	1	3	9	16
2	1	5	14	34
3	1	4	13	32
4	3	4	13	34
GOOD SPRING	3	4	9	19
BAD SPRING	1	6	15	38
JULY 22				
SITE 1	1	3	9	15
2	2	2	12	31
3	2	4	10	26
4	3	5	14	38
GOOD SPRING	3	4	8	20
D SPRING	2	4	8	16
BACKGROUND SAMPLE	1	4	9	19


D
⊠ - CHARCOAL PACKETS PLACED IN SPRING CREEK. MAY 19, 1971
SPRING
CREEK
#1
#2
#3
#4
ALGAE GROWTH
300' ±
DYED
LAGOONS
HOFFMAN - TAFF
CHEMICAL
PLANT
PLATE 1
D-54


CHARCOAL PACKETS PLACED IN SPRING CREEK JUNE 10, 1971
#5 & #6 PLACED IN SPRINGS ON ERWIN PROPERTY
SPRING CREEK
#1
#2
#3
ALGAE GROWTH
ROAD
FENCE LINE
HOFFMAN-TAFF CHEMICAL PLANT
DYED
LAGOONS
SEEPS
CREEK
PLATE 2
D-55

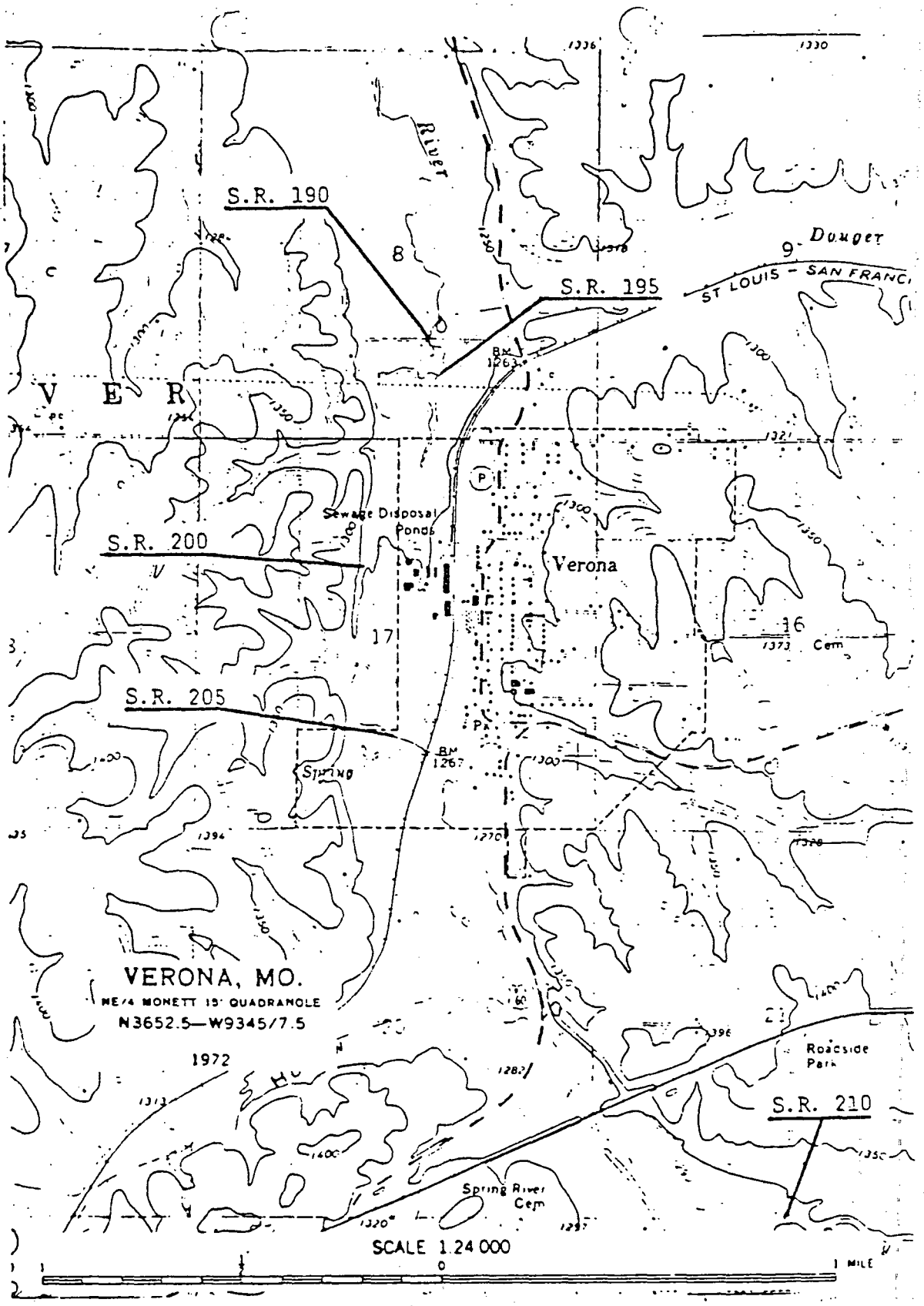


FIGURE D-5 - RECONNAISSANCE STATIONS FROM EPA 1971, SURVEY AROUND HOFFMAN-TAFF.

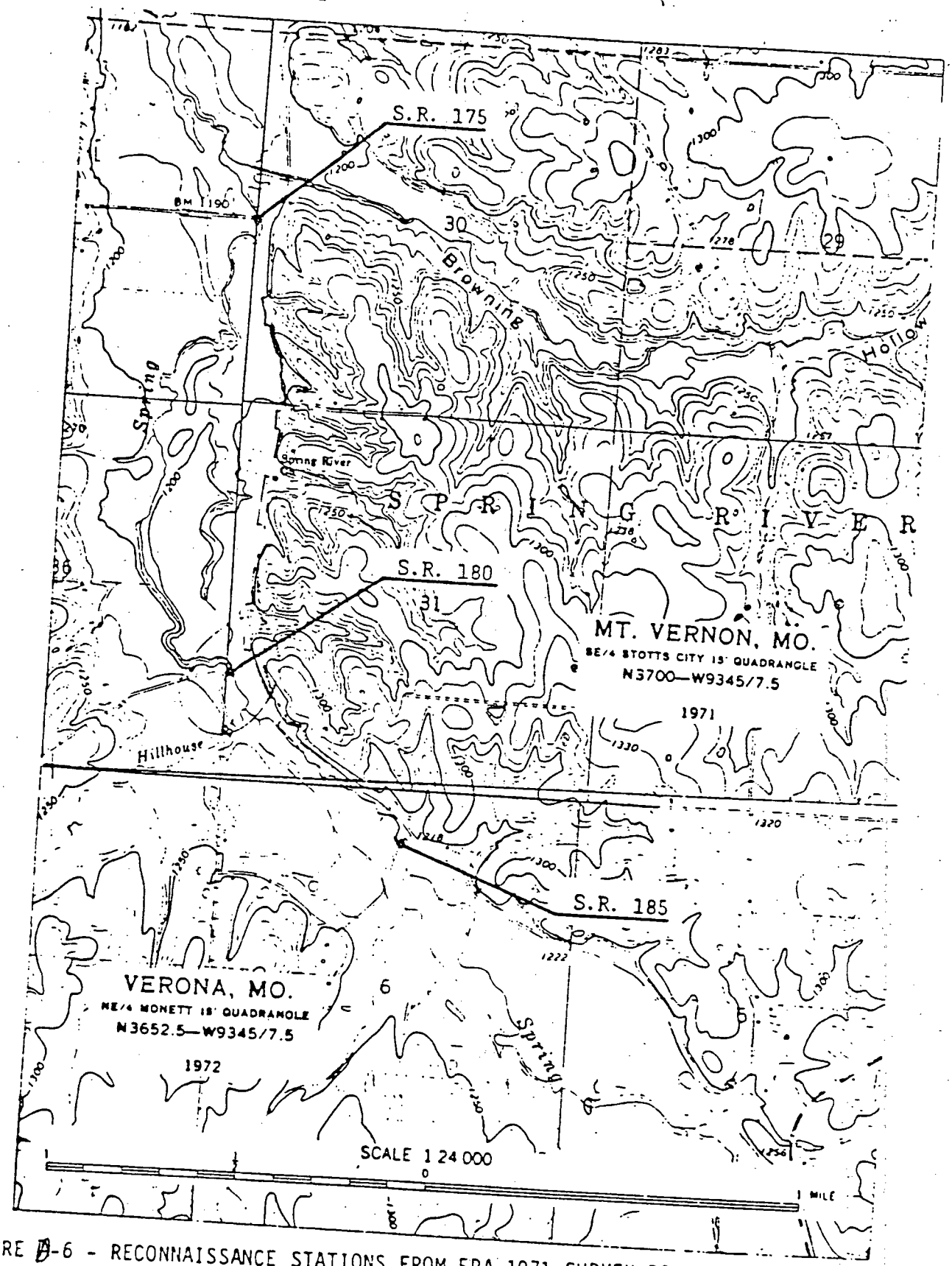


FIGURE B-6 - RECONNAISSANCE STATIONS FROM EPA 1971 SURVEY DOWNSTREAM FROM HOFFMAN TAFF.